Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed syllabus (DJ19)

First Year B.Tech

in

Common For All Programs

(Semester I and II)

Revision: 1 (2019)
With effect from the Academic Year: 2019-2020

1st August, 2019

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Scheme for First Year Undergraduate Program (Common to all branches) : Semester I (Autonomous)
(From the Academic Year 2019-2020)

Semester I

Sr	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment(B)							Aggregate (A+B)	Credits earned	
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	SEE Total (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Termwork			CA Total (B)			
																Laboratory Work	Tutorial / Mini project / Presentation/ Journal	Term Work Total				
1	DJ19FEC101	Engineering Mathematics - I	4	--	--	4	3	75	--	--	--	75	25	25	25	--	--	--	25	100	4	5
	DJ19FET101	Engineering Mathematics - I Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	--	25	25	25	25	1	
2	DJ19FEC102	Engineering Physics - I	2	--	--	2	3	75	--	--	--	75	25	25	25	--	--	--	25	100	2	3.5
	DJ19FEL102	Engineering Physics - I Laboratory & Tutorial	--	1	1	1.5	--	--	--	--	--	--	--	--	--	25	25	50	Scaled to 25	25	1.5	
3	DJ19FEC103	Engineering Chemistry - I	2	--	--	2	3	75	--	--	--	75	25	25	25	--	--	--	25	100	2	3.5
	DJ19FEL103	Engineering Chemistry - I Laboratory & Tutorial	--	1	1	1.5	--	--	--	--	--	--	--	--	--	25	25	50	Scaled to 25	25	1.5	
4	DJ19FEC104	Engineering Mechanics	3	--	--	3	3	75	--	--	--	75	25	25	25	--	--	--	25	100	3	4
	DJ19FEL104	Engineering Mechanics Laboratory	--	2	--	1	--	--	--	--	--	--	--	--	--	15	10	25	25	25	1	
5	DJ19FEC105	Basic Electrical & Electronics Engineering	3	--	--	3	3	75	--	--	--	75	25	25	25	--	--	--	25	100	3	4
	DJ19FEL105	Basic Electrical & Electronics Engineering Laboratory	--	2	--	1	--	--	--	--	--	--	--	--	--	15	10	25	25	25	1	
6	DJ19FEW	Workshop@	--	2	--	1	--	--	--	--	--	--	--	--	--	25	--	25	25	25	1	1@
7	DJ19A1	Indian Knowledge Tradition (Non Credit)$	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		Total	**15**	**8**	**3**	**21**	--	**375**	--	--	--	**375**	**125**	**125**	**125**	**105**	**95**	**200**	**105**	**650**	**20**	**20**

@ For Electronics Engg. (Div B), Information Technology (Div D), Mechanical Engg. (Div F), Electronics and Telecommunication Engg. (Div H), Computer Engg. (Div J) and Biomedical Engg.&TWFS,J&K,PMSSS (Div K) : Credit to be given at the end of the same academic year.

$ For Chemical Engg. (Div A), Production Engg. (Div C), Mechanical Engg. (Div E), Electronics and Telecommunication Engg. (Div G) and Computer Engg. (Div I)

Prepared by Checked by Head of the Department Principal

Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Course Structure and Syllabus

of

First Year (Semester I) B. Tech.

(Common for all Programs)

Prepared by: - Board of Studies for FE

Recommended by: - Academic Council of D. J. Sanghvi College of Engineering

Approved by: - Governing Body of D. J. Sanghvi College of Engineering

Revision: 1 (DJ19)

With effect from the Academic Year: 2019-2020

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : I**
Course : Engineering Mathematics-I	**Course Code: DJ19FEC101**
Course : Engineering Mathematics-I Tutorial	**Course Code: DJ19FET101**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**25**
4	**--**	**1***	**5**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				--	--	--	--	**25**	**25**	

Pre-requisite: Knowledge of

1. Inverse of a matrix, addition, multiplication and transpose of a matrix
2. Algebra of Complex Number. Cartesian, polar and exponential form of complex number.

Objectives:

1. To develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.
2. To provide hands on experience using SCILAB software to handle real life problems.

Outcomes: On completion of the course, learner will be able to:

1. Illustrate the basic concepts of Complex numbers.
2. Apply the knowledge of complex numbers to solve problems in hyperbolic functions and logarithmic function.
3. Illustrate the basic principles of Partial differentiation.
4. Illustrate the knowledge of Maxima, Minima and Successive differentiation.
5. Apply principles of basic operations of matrices, rank and echelon form of matrices to solve simultaneous equations.
6. Illustrate SCILAB programming techniques to the solution of linear and simultaneous algebraic equations.

Detailed Syllabus: (unit wise)

Unit	**Description**	**Duration**
1	**Matrices:** 1.1. Types of Matrices (Symmetric, Skew- Symmetric, Hermitian, Skew Hermitian, Unitary, Orthogonal Matrices and properties of Matrices). Rank of a matrix using Echelon forms, reduction to normal form and PAQ form. 1.2. System of homogeneous and non –homogeneous equations, their consistency and solutions. Linear dependent and independent vectors. 1.3. Application of inverse of a matrix to coding theory.	**09**

2	**Complex Numbers:** 2.1. Statement of D'Moivre's Theorem. 2.2. Expansion of $sin^n\theta, cos^n\theta$in in terms of sines and cosines of multiples of θ and Expansion of sin nθ, cos nθ in powers of sin θ, cos θ. 2.3. Powers and Roots of complex number.	**07**
3	**Hyperbolic function and Logarithm of Complex Numbers:** 3.1. Circular functions of complex number and Hyperbolic functions. Inverse Circular and Inverse Hyperbolic functions. Separation of real and imaginary parts of all types of functions. 3.2 Logarithmic Functions, Separation of real and Imaginary parts of Logarithmic Functions.	**06**
4	**Successive differentiation and Partial Differentiation:** 4.1. Successive differentiation: nth derivative of standard functions. Leibnitz's theorem (without proof) and problems 4.2. Partial Differentiation: Function of several variables, Partial derivatives of first and higher order. Differentiation of composite function. Total differentials, implicit functions. 4.3. Euler's Theorem on Homogeneous functions with two and three independent variables (with proof). Deductions from Euler's theorem.	**12**
5	**Applications of Partial Differentiation and Expansion of Function:** 5.1 Maxima and Minima of a function of two independent variables, Lagrange's method of undetermined multipliers with one constraint. 5.2. Jacobian's of two and three independent variables. 5.3. Taylor's Theorem (Statement only) and Taylor's series, Maclaurin's series (Statement only). Expansion of standard functions. 5.4. Indeterminate forms, L- Hospital Rule, problems involving series.	**12**
6	**Numerical Solutions of Transcendental Equations and System of Linear Equations:** 6.1 Solution of Transcendental Equations: Solution by (1) Newton Raphson Method, (2) Regula –Falsi Method. 6.2 Solution of system of linear algebraic equations, by (1) Gauss Jacobi Iteration Method, (2) Gauss Seidal Iteration Method, (3) Gauss Elimination Method, (4) Gauss Jordan Method.	**06**

* Batch wise tutorials are to be conducted.

Books Recommended:

Text books:

1. Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publication
2. Advanced Engineering Mathematics by H. K. Dass, 28th edition, S. Chand 2010.

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern Limited, 9th Ed.
2. Matrices, Shanti Narayan, S. Chand publication.
3. Applied Numerical Methods with MATLAB for Engineers and Scientists by Steven Chapra, McGraw Hill
4. Elementary Linear Algebra with Application by Howard Anton and Christ Rorres. 6th edition. John Wiley & Sons, INC.
5. Dennis G. Zill, Warren S. Wright, "Advanced Engineering Mathematics"

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Tutorials: (Details of Term work)

1. Batch wise tutorials are to be conducted.
2. Students must be encouraged to write SCILAB Programs in tutorial class only. Each Student has to write at least 4 SCILAB Programs (including print out) and at least 6 class tutorials on entire syllabus.
3. SCILAB tutorials will be based on (i) Gauss Elimination Method (ii) Gauss Jordan Method (iii) Gauss Jacobi Iteration Method(iv) Gauss Seidal Iteration method (v) Newton Raphson Method (vi) Regula –Falsi method.

The distribution of marks for term work shall be as follows:

i. Class Tutorials on entire syllabus : 15 marks
ii. SCILAB Tutorials : 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of Tutorial work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

<table>
<tr><td colspan="8">Program: First Year Engineering (All Branches)</td><td colspan="2">Semester : I</td></tr>
<tr><td colspan="8">Course : Engineering Physics-I</td><td colspan="2">Course Code: DJ19FEC102</td></tr>
<tr><td colspan="8">Course : Engineering Physics - I Laboratory & Tutorial</td><td colspan="2">Course Code: DJ19FEL102</td></tr>
<tr><td colspan="4">Teaching Scheme
(Hours / week)</td><td colspan="6">Evaluation Scheme</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>A+B+C</td><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="2">Term work Avg.</td><td rowspan="3">25</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">3.5</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project presentation</td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>25</td><td>25</td><td>25</td></tr>
</table>

Pre-requisite: Basic foundations of physics and mathematics till HSc or equivalent is necessary to comprehend engineering physics curriculum in a lucid way.

Objectives:

1. Identify and understand the fundamental physical principles underlying engineering technologies—a prerequisite to become successful engineer.
2. To provide inclusive knowledge of fundamental physical principles encouraging engineering students to venture in research field

Outcomes: After completion of the course, students would be able to:

1. Comprehend the concepts of solid state physics and apply them in designing solid state devices.
2. Relate the scope and foundation of quantum mechanics and its role in development of modern technology.
3. Assimilate the wide scope of Nanotechnology in modern developments and its role in emerging innovative applications.
4. Employ the concepts of optics in precision measurements.

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Detailed Syllabus: (Unit wise)

Unit	Description	Duration
1	**SOLID STATE PHYSICS** **(*Prerequisites :* *Crystal Physics (Unit cell, Space lattice, Crystal structure, Simple Cubic, Body Centered Cubic, Face Centered Cubic, Production of X-rays, Intrinsic and extrinsic semiconductors, Energy bands in conductors, semiconductors and insulators, Semiconductor diode, I-V characteristics in forward and reverse bias*)** • Introduction • Miller indices; Interplanar spacing; • X-ray diffraction and Bragg's law; Determination of Crystal structure using Bragg's spectrometer; • Direct & indirect band gap semiconductor; Fermi level; Fermi dirac distribution; Fermi energy level in intrinsic & extrinsic semiconductors; effect of impurity concentration and temperature on fermi level; mobility, current density; Hall Effect; Fermi Level diagram for p-n junction (unbiased, forward bias, reverse bias); • Semiconductor devices: LED, Zener diode as a voltage regulator, Solar cell.	**8 hrs**
2	**QUANTUM PHYSICS** **(*Prerequisites :* *Dual nature of radiation, Photoelectric effect, Matter waves-wave nature of particles, de-Broglie relation, Davisson-Germer experiment*)** • Introduction • De Broglie hypothesis of matter waves; properties of matter waves; • Wave packet, phase velocity and group velocity • Wave function; Physical interpretation of wave function; • Heisenberg uncertainty principle; Single slit electron diffraction experiment; nonexistence of electron in nucleus; • Schrodinger's time dependent wave equation; time independent wave equation; Particle trapped in one dimensional infinite potential well • Fundamentals of Quantum Computing.	**7 hrs**
3	**NANOSCIENCE & NANOTECHNOLOGY** ***(Prerequisites:** Scattering of electrons, Tunnelling effect, Electrostatic focusing, magneto static focussing)* • Introduction • Dimensional classification of Nanomaterials	**5 hrs**

	• Properties of Nanomaterials • Synthesis of Nanomaterials • Properties of carbon allotropes (CNT, Fullerenes, Graphene) • Applications of Nanotechnology • Characterization techniques: Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Atomic Force Microscope (AFM), Scanning Tunnelling Microscope (STM)	
4	**OPTICS-I** ***(Prerequisites :*** *Wave front and Huygen's principle, reflection and refraction, Interference by division of wave front, Youngs double slit experiment**)*** • Interference by division of amplitude, Stoke's Relation • Interference in thin film of constant thickness due to reflected and transmitted light; origin of colours in thin film; • Interference in Wedge shaped film; • Formation of Newton's rings • 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 and Highly reflecting films.	**6 hrs**

List of Laboratory Experiments: (Minimum 5)

1. Determination of radius of curvature of a lens using Newton's ring set up
2. Determination of diameter of wire/hair or thickness of paper using Wedge shape film method.
3. Study of Miller Indices.
4. Study of Hall Effect.
5. Determination of energy band gap of semiconductor.
6. Study of Zener diode as voltage regulator.
7. Study of I/V characteristics of LED
8. Determination of Planck's constant using Photo cell.
9. Study of I / V characteristics of semiconductor diode
10. Simulation experiments based on nanotechnology using open source simulation softwares like Avogadro, Chimera, JMOL etc

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. A text book of Engineering Physics-Avadhanulu & Kshirsagar, S. Chand
2. A Text Book of Engineering Physics, S. O. Pillai, New Age International Publishers.
3. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
4. Modern Engineering Physics – Vasudeva, S.Chand
5. Engineering Physics – R K Gaur & S L Gupta, Dhanpat Rai Publications
6. Engineering Physics – Shatendra Sharma & Jyotsna Sharma, Pearson publications
7. Engineering Physics – D. K. Bhattacharya & Poonam Tandon, Oxford publications
8. Engineering Physics – V Rajendran, McGraw Hill Educations
9. Nano: The essentials, understanding Nanoscience and Nanotechnology, T. Pradeep, Tata Mc Graw Hill, 2007

Reference Books:

1. Fundamentals of optics by Jenkins and White, McGrawHill
2. Solid State Electronic Devices- B. G. Streetman, Prentice Hall Publisher
3. Concepts of Modern Physics- Arther Beiser, Tata McGraw Hill
4. Introduction to Solid State Physics- C. Kittel, John Wiley& Sons publisher
5. Advances in Nano Materials And Applications: History of Nanotechnology From Pre-Historic to Modern Times, Madhuri Sharon, Wiley, USA

Evaluation Scheme:

Semester End Examination (A):

Theory:

3. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
4. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory: (Term test: 25 Marks)

4. Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 30% syllabus is completed.
5. Total duration allotted for writing each of the paper is 1 hr.
6. Average of the marks scored in both the two tests will be considered for final grading.

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Laboratory & Tutorials: (Term work: 25 Marks)

1. Term work shall consist of Laboratory work and Tutorial sessions.
2. Batch wise laboratory work is to be conducted to develop a rational temperament for scientific observations which lead to constructive inferences essential for technology studies. Students must be encouraged to perform minimum five experiments and submit the laboratory Journal.
3. Class wise tutorial sessions are to be conducted on topics covering entire syllabus for effective interactive sessions focussing on better understanding of the subject. Students must be encouraged to perform minimum 7 tutorials (conducted as Problem solving sessions, Assignments, Power point presentations, Mini Project presentations, Report writing etc) and submit the same.

The distribution of 25 marks for term work shall be as follows:

1. Laboratory work (Performance of Experiments & Journal Documentation): 25 marks

2. Tutorials: 25 marks

3. Average of the marks scored in both Laboratory Work & Tutorials will be considered for final term work grading.

The final certification and acceptance of term work will be subject to satisfactory performance and completion of both Laboratory work & Tutorials and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

<table>
<tr><td colspan="5">Program: First Year Engineering (All Branches)</td><td colspan="5">Semester : I</td></tr>
<tr><td colspan="5">Course : Engineering Chemistry-I</td><td colspan="5">Course Code: DJ19FEC103</td></tr>
<tr><td colspan="5">Course : Engineering Chemistry - I Laboratory & Tutorial</td><td colspan="5">Course Code: DJ19FEL103</td></tr>
<tr><td colspan="4">Teaching Scheme (Hours / week)</td><td colspan="5">Evaluation Scheme</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>A+B+C</td><td colspan="3">Semester End Examination Marks (A)</td><td colspan="2">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Term work Avg.</td><td rowspan="3">25</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">3.5</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project presentation</td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>25</td><td>25</td><td>25</td></tr>
</table>

Pre-requisite: Knowledge of

1. Electronic configuration, Hybridization, Bond formation, Homogenous and Heterogeneous systems
2. Basic process of polymerization and fundamental properties of water.

Objectives:

3. To obtain a strong hold on basic concepts of Chemistry that form fundamental principles of technology.
4. To give exposure to recent development in the course related topics.

Outcomes: After completion of the course, students would be able to:

5. Analyze microscopic chemistry in terms of atomic and molecular orbitals and aromaticity of organic molecules.
6. Rationalize various phase transformation using thermodynamics.
7. Apply the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields.
8. Analyze the quality of water and suggest suitable methods of treatment.

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Detailed Syllabus: (Unit wise)

Unit	Description	Duration
1	**Atomic and Molecular Structure** • Atomic orbitals (s,p,d,f) orbital shapes, Electronic Configuration. • Molecular orbital theory (MOT), bonding and anti-bonding orbitals. • Molecular orbital diagrams of Homonuclear and Heteronuclear diatomic molecules- H_2, Li_2, Be_2, O_2, CO, NO, their bond order and magnetic properties. • Aromaticity, Huckel's rule. • Structure and bonding of benzene and pyrrole.	**6 hrs**
2	**Intermolecular Forces and Phase Rule** • Ionic, dipolar, Hydrogen bonding and Vander Waal's interactions. • Phase Rule-Gibb's Phase Rule, Terms involved with examples. • One Component System (Water). • Reduced Phase Rule, Two Component System (Pb- Ag). • Advantages and Limitations of Phase Rule. • Numerical based on Phase rule	**6 hrs**
3	**Polymers** • Introduction: Definition- Polymer, polymerization, classification. • Molecular weight (Number average and Weight average), Numerical problems on molecular weight. • Effect of heat on polymers (glass transition temperature), Viscoelasticity. • Classification-Thermoplastic and Thermosetting polymers. • Compounding of plastic, Fabrication of plastic by Compression, Injection, Transfer and Extrusion moulding. • Preparation, properties and uses of PMMA, Kevlar, Phenol-Formaldehyde, Urea Formaldehyde. • Conducting Polymers. • Polymers in medicine and surgery.	**7 hrs**
4	**Water** • Introduction - Impurities in water. • Hardness of water- units (no conversions), types and numerical problems. • Determination of hardness of water by EDTA method and numerical problems.	**7 hrs**

	• Softening of water by Ion Exchange process and numerical problems. • BOD, COD- definition, significance and Numerical problems. • Water purification-membrane technology- Electrodialysis, Reverse osmosis, and Ultra filtration. • Sewage treatment by activated sludge process.	

List of Laboratory Experiments: (Minimum 5)

1. To determine Chloride content of water by Mohr's Method.
2. To determine total, temporary and permanent hardness of water sample by EDTA method.
3. To determine pH of different solutions using pH meter.
4. Determination of percent of Zn/Cu in brass.
5. Molecular weight determination of polymers by Oswald Viscometer.
6. Synthesis of UF, PF, Nylon 66.
7. Determination of COD.
8. Synthesis of biodegradable polymer using corn starch or potato starch.
9. Determination of surface Tension of a given liquid at room temperature using Stalgmometer by drop number method.
10. Determination of percent of Fe in Plain carbon steel.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

10. Engineering Chemistry - Jain & Jain (DhanpatRai)

11. Engineering Chemistry – Dara &Dara (S Chand)

Reference Books:

6. Engineering Chemistry - Wiley India (ISBN – 9788126519880)

7. A Text Book of Engineering Chemistry – Shashi Chawla (DhanpatRai)

8. Concise Inorganic Chemistry – J D LEE

9. Essentials of Physical Chemistry—B S Bahl, Arun Bahl, G D Tuli.

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Evaluation Scheme:

Semester End Examination (A):

Theory:

5. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
6. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 30% syllabus is completed.

7. Total duration allotted for writing each of the paper is 1 hr.
8. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory & Tutorials:

Term work shall consist of Laboratory work and Tutorial sessions.

1. Batch wise laboratory work is to be conducted to develop a rational temperament for scientific observations which lead to constructive inferences essential for technology studies. Students must be encouraged to perform minimum five experiments and submit the laboratory Journal.
2. Class wise tutorial sessions are to be conducted on topics covering entire syllabus. Students must be encouraged to perform minimum 10 tutorials and submit the same.

The distribution of 25 marks for term work shall be as follows:

1. Laboratory work (Performance of Experiments & Journal Documentation): 25 marks
2. Tutorials: 25 marks
3. Average of the marks scored will be considered for final term work grading.

The final certification and acceptance of term work will be subject to satisfactory performance of Laboratory work & Tutorials and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester: I**
Course : Engineering Mechanics	**Course Code: DJ19FEC104**
Course : Engineering Mechanics Laboratory	**Course Code: DJ19FEL104**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**25**
3	**2**	**-**	**4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				--	**--**	**--**	**15**	**10**	**25**	

Pre-requisite: Knowledge of

1. Basics of Trigonometry
2. Newton's Laws of motion

Objectives:

1. To acquaint the concept of equilibrium.
2. To study and analyze motion of moving particles/bodies.

Outcomes: On completion of the course, learner will be able to:

1. Illustrate the effect of force and moment and apply the same along with the concept of equilibrium systems with the help of FBD.
2. Demonstrate the understanding of Centroid and its significance and locate the same.
3. Correlate real life application to specific type of friction and estimate required force to overcome friction.
4. Establish relation between velocity and acceleration of a particle and analyze the motion by plotting the relation
5. Analyze general plane motion of rigid bodies using Instantaneous centre.
6. Analyze particles in motion using force and acceleration, work-energy and impulse-momentum principles

Detailed Syllabus: (unit wise)

Unit	**Description**	**Duration**
1	**1.1 System of Coplanar Forces:** Classification of force systems, Principle of transmissibility, composition and resolution of forces. Resultant of coplanar force system (Concurrent forces, parallel forces and non-concurrent Non-parallel system of forces). Moment of force about a point, Couples, Varignon's Theorem. Force couple system. **1.2 Centroid:** First moment of Area, Centroid of composite plane Laminas.	**06** **03**
2	**2.1 Equilibrium of System of Coplanar Forces**: Conditions of equilibrium for concurrent forces, parallel forces and non-concurrent non-	**05**

	parallel general forces and Couples. Equilibrium of rigid bodies-free body diagrams. **2.2 Equilibrium of Beams:** Types of beams, simple and compound beams, type of supports and reaction: Determination of reactions at supports for various types of loads on beams. (Excluding problems on internal hinges).	**03**
3	**Friction**: Revision of Static Friction, Dynamic/ Kinetic Friction, Coefficient of Friction, Angle of Friction, Laws of friction. Concept of Cone of friction. Equilibrium of bodies on inclined plane. Application to problems involving wedges and ladders.	**05**
4	**4.1 Kinematics of Particle**: Rectilinear motion. Motion curves (a-t, v-t, s-t curves). Motion along plane curved path. Tangential & Normal component of acceleration. **4.2 Kinematics of Rigid Body:** Translation, Rotation and General Plane motion of Rigid body. The concept of Instantaneous center of rotation (ICR) for the velocity. Velocity analysis of rigid body using ICR.	**06** **03**
5	**5.1 Kinetics of a Particle: Force and Acceleration:** D'Alemberts Principle, concept of Inertia force, Equations of dynamic equilibrium, Newton's second law of motion. **(Analysis limited to simple rectilinear systems only).** **5.2 Kinetics of a Particle: Work and Energy:** Work Energy principle for a particle in motion. Application of Work – Energy principle to a system consisting of connected masses and Springs. **5.3 Kinetics of a Particle: Impulse and Momentum:** Principle of linear impulse and momentum. **Impact and collision:** Law of conservation of momentum, Coefficient of Restitution. Direct Central Impact and Oblique Central Impact. Loss of Kinetic Energy in collision of inelastic bodies.	**03** **03** **02**

List of Laboratory Experiments: (Any Six)

1. Verification of Polygon law of coplanar forces.
2. Verification of law of Moment using Bell crank lever.
3. Determination of Support reaction for beam.
4. Determination of coefficient of friction using Inclined plane
5. Verification of Lami's theorem using Jib crane.
6. Resultant of non-concurrent non-parallel coplanar force system.
7. Determination of coefficient of restitution for Collision of elastic bodies (Law of conservation of momentum).

Books Recommended:

Text books:

1. Engineering Mechanics by A K Tayal, Umesh Publication.
2. Engineering Mechanics by S Ramamrutham Dhanpat Rai Publishing company.

Reference Books:

1. Engineering Mechanics by R. C. Hibbeler. Pearson education.
2. Engineering Mechanics by Beer &Johnston, Tata McGraw Hill
3. Engineering Mechanics by Bhattacharya B, Oxford University press
4. Engineering Mechanics by Nelson and Mc Lean, Tata McGraw Hill

Evaluation Scheme:

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work):

Term work shall consist of minimum 6 experiments and 5 assignments of minimum six problems from each unit of the syllabus.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up, Power Point Presentation and Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of Laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

<table>
<tr><td colspan="8">Program: First Year Engineering (All Branches)</td><td colspan="3">Semester : I</td></tr>
<tr><td colspan="8">Course : Basic Electrical & Electronics Engineering</td><td colspan="3">Course Code: DJ19FEC105</td></tr>
<tr><td colspan="8">Course : Basic Electrical & Electronics Engineering Laboratory</td><td colspan="3">Course Code: DJ19FEL105</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td colspan="6">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="6">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="6">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="6">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="3">Total Term work</td><td rowspan="3">50</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">2</td><td rowspan="2">--</td><td rowspan="2">4</td><td colspan="2">Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td colspan="2">--</td><td>--</td><td>--</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite: Knowledge of

1. Concepts of charge, current and voltage.
2. Concepts of electrical circuit elements (R, L and C).
3. Concepts of Ohm's law, resistivity and series & parallel connections.
4. Concepts of semiconductors and P-N junction.

Objectives:

1. To develop the basic understanding of the concepts of DC circuits and AC circuits and analyse their operation using various methods and techniques.
2. To get an insight of working of various electrical systems as well as study of electronic devices.

Outcomes: On completion of the course, learner will be able to:

1. To implement the fundamentals of DC circuits and apply knowledge for analysing network theorems in DC circuits.
2. To analyze single phase as well as three phase AC circuits.
3. To analyze the performance of single phase transformer and three phase systems.
4. To study the characteristics of basic PN diode and implement the basic circuits like rectifiers, clippers and clampers using PN diode.

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**DC Circuits:** Introduction to ideal and practical voltage and current sources, Kirchhoff's current and voltage laws, Mesh and Nodal analysis, Supernode and Supermesh analysis, Introduction to dependent sources and examples using Mesh and Nodal analysis.	**08**
2	**DC Network Theorems:** Source transformation and star – delta connections, Thevenin's Theorem and Norton's Theorem, Superposition Theorem and Maximum Power Transfer Theorem.	**06**
3	**AC Circuits:** Generation and representation of alternating voltage and currents, RMS and Average value, phasor representation, AC through resistance, inductance and capacitance, R-L , R-C and R-L-C series and parallel circuits, phasor diagrams. Analysis of real power, reactive power, apparent power, power factor, Series and parallel resonance, Q-factor and bandwidth.	**12**
4	**Electrical Systems:** Three-phase balanced circuits, voltage and current relations in star and delta connections, Construction, working principle, emf equation, ideal and practical transformer, transformer on no load and on load, phasor diagrams, equivalent circuit, regulation and efficiency.	**10**
5	**Electronics:** P-N Junction diode, application of diodes as rectifiers: half wave rectifier, full wave rectifier, bridge rectifier (resistive load), Introduction to clipper and clamper circuits using diodes.	**06**
	Total	**42**

List of Laboratory Experiments: (Any Seven)

1. Mesh and Nodal analysis.
2. Verification of Superposition Theorem.
3. Verification Thevenin's Theorem.
4. Verification Norton's Theorem.
5. Verification of maximum power transfer Theorem.
6. Study of R-L series and R-C series circuit.
7. R-L-C series resonance circuit.
8. R-L-C parallel resonance circuit.
9. Rectifiers: HWR and FWR.
10. Clipper/clamper circuits.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Ravish Singh, "Basic Electrical Engineering", Tata McGraw Hill, 2018.
2. B. R. Patil, "Basic Electrical Engineering", Oxford Higher Education, 2016.
3. R. S. Sedha, "A textbook of Electronis Devices and Circuits", S. Chand, 2002

Reference Books:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
4. V.D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Term work shall consist of minimum 7 experiments and minimum 2 assignments.

The distribution of marks for term work shall be as follows:

1. Laboratory work (Performance of Experiments): 15 Marks
2. Journal Documentation (Write-up, Power Point Presentation and Assignments: 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : I / II**
Course : Workshop Practice (Laboratory)	**Course Code: DJ19FEW**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				-			-	-	-	-
				Laboratory Examination			**Term work**		**Total Term work**	**25**
--	**2**	--	**1@**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				-	-	--	**25**	-	**25**	

@ Workshop Practice (Laboratory) will be conducted in either semester I or semester II. Credit to be given at the end of the same academic year.

Pre-requisite: None

Objectives:

1. To explain the concepts of industrial safety and the importance of working safely
2. To interpret basic engineering blueprints
3. To understand the use of hand tools in fabrication processes.
4. To understand various fabrication processes and machine protocols.
5. To provide hands-on experience on basic machine tools.

Outcomes: On completion of the course, learner will be able to:

1. Get oriented to an engineering workshop environment and will learn to conduct oneself adhering to the safety norms and set procedures.
2. Get familiarized with various methods of commonly used fabrication techniques and the type of hand tools required to perform such of these techniques.
3. Prepare simple jobs like joints, component of simple shape etc. as per component drawings with reasonable degree of tolerance.

Detailed Syllabus: (Unit wise)

Unit	**Description**	**Duration**
1	**Fitting** Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling, tapping.	**14**
2	**Carpentry** Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood turning and modern wood turning methods.	**14**
3	**Welding** Edge preparation for welding jobs. Arc welding for different job like, Lap welding of two plates, butt welding of plates with simple cover, arc welding to join plates at right angles	**06**

4	**Sheet Metal Practice** Introduction to primary technology processes involving bending, punching and drawing various sheet metal joints, development of joints.	**06**
5	**Plumbing** Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic line involving fixing of a water tap and use of coupling, elbow, tee, and union etc.	**06**
6	**PCB** Layout drawing: Positive and negative, PCB etching and drilling, Tinning and soldering technique.	**06**

List of Laboratory Experiments:

1. To study various types fitting tools and make a V-fitting/T-fitting from the given two M.S pieces.
2. To study various types of carpentry tools and prepare half-lap joint or T-lap joint.
3. To study various welding techniques and make a V-butt or Lap-joint, using the given mild steel pieces by arc welding
4. To study various types of sheet metal tools and make square or rectangular tray.
5. To study plumbing tools and joints, and make one job containing various pipe fitting.
6. To make printed circuit board as per the given drawing.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text books:

1. Mechanical Workshop Practice, 2nd Edition, K.C. John, PHI Learning Pvt.Ltd.2014.
2. Manufacturing Technology-Vol I, 4th Edition, P.N. Rao, Tata McGraw Hill, 2014.
3. Printed Circuit Boards: Design, Fabrication, assembly and testing, 1st Edition, R.S. Khandpur, Tata McGraw Hill, 2005

Reference Books:

1. Manufacturing Processes and Systems,9th Edition, P.F.Ostwald, John Willy &Sons INC. UK, 2008
2. Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment, 3rd Edition, R.P. Singh, IK International Publishing House Pvt. Ltd. 2012

Evaluation Scheme:

Laboratory: (Term work)

Term work shall consist of minimum one main job and two group jobs

The distribution of marks for term work shall be as follows:

Laboratory work (Performance of Experiments): 25 Marks

One main Job (Job No. 1 or Job No. 2) : 15 marks

Two Group Jobs (Any two job from Job No. 3 to Job No.6) : 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester I (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	Semester : I / II
Course : Indian Knowledge Tradition	Course Code: DJ19A1

Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Avg.	
				--			--	--	--	--
				Laboratory Examination			Term work		Total Term work	--
1	--	--	--	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				--	--	--	--	--	--	

Pre-requisite: Nil

Objectives:

1. To impart knowledge about basic principles of thought process, reasoning and inferencing.
2. To make students aware of Indian Traditional knowledge Systems connecting society and nature.
3. To acquaint students with holistic life style of yogic science and wisdom in modern society with rapid technological advancements and societal disruptions

Outcomes: On completion of the course, learner will be able to:

1. Understand the importance nature and scope of Indian Knowledge Tradition
2. Know the basic structure of Indian Knowledge Tradition.
3. Acquire knowledge about the various systems followed to impart knowledge in ancient and medieval India.
4. Be aware of Yoga system and its impact on health.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to the Indian knowledge system** 1.1. Definition and Nature 1.2. Origin 1.3. Importance	**02**
2	**History of Indian Knowledge System** 2.1 Ancient 2.2 Medieval 2.3 Contemporary	**02**
3	**Basic Structure of Indian Knowledge System** 3.1 Ancient 3.2 Medieval 3.3 Contemporary	**03**
4	**Types of Indian Knowledge System** 4.1. Gurukul 4.2. Vedic 4.3. Modern	**02**

5	**Yoga and Health Care** 5.1. Origin of Yoga 5.2. History of Yoga 5.3. Importance of Yoga	**02**
6	**Case Studies**.	**02**

Course Completion

At the end of the semester, the faculty will certify the student for completion of the course.

Books Recommended:

Suggested Text/Reference Books

1. V.Sivaramakrishnan(Ed.),*Cultural Heritage of India-course material*,Bharatiya Vidya Bhavan, Mumbai. 5thEdition,2014
2. GN Jha (Eng. Trans.), Ed. RN Jha, *Yoga-darshanam with Vyasa Bhashya*, VidyanidhiPrakashan, Delhi2016
3. RN Jha, *Science of Consciousness Psychotherapy and Yoga Practices*, Vidyanidhi Prakashan, Delhi2016

Prepared by Checked by Head of the Department Principal

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Scheme for First Year Undergraduate Program (Common to all branches) : Semester II (Autonomous)
(From the Academic Year 2019-2020)

Semester II

Sr	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment(B)							Aggregate (A+B)	Credits earned	
																Termwork						
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	SEE Total (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Laboratory Work	Tutorial / Mini project / Presentation/ Journal	Term Work Total	CA Total (B)			
1	DJ19FEC201	Engineering Mathematics - II	4	--	--	4	3	75	--	--	--	75	25	25	25	--	--	--	25	100	4	**5**
	DJ19FET201	Engineering Mathematics - II _ Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	--	25	25	25	25	1	
2	DJ19FEC202	Engineering Physics - II	2	--	--	2	3	75	--	--	--	75	25	25	25	--	--	--	25	100	2	**3.5**
	DJ19FEL202	Engineering Physics - II _ Laboratory & Tutorial	--	1	1	1.5	--	--	--	--	--	--	--	--	--	25	25	50	Scaled to 25	25	1.5	
3	DJ19FEC203	Engineering Chemistry - II	2	--	--	2	3	75	--	--	--	75	25	25	25	--	--	--	25	100	2	**3.5**
	DJ19FEL203	Engineering Chemistry - II _ Laboratory & Tutorial	--	1	1	1.5	--	--	--	--	--	--	--	--	--	25	25	50	Scaled to 25	25	1.5	
4	DJ19FEC204	Engineering Graphics *#	2	--	--	2	2	50	--	--	--	50	25	25	25	--	--	--	25	75	2	**3**
	DJ19FEL204	Engineering Graphics_Laboratory	--	2	--	1	--	--	--	--	--	--	--	--	--	10	15	25	25	25	1	
5	DJ19FEC205	Computer Programming *#	2	--	--	2	2	50	--	--	--	50	25	25	25	--	--	--	25	75	2	**3**
	DJ19FEL205	Computer Programming _Laboratory	--	2	--	1	--	--	--	--	--	--	--	--	--	25	--	25	25	25	1	
6	DJ19FEC206	Effective Communication Skills	2	--	--	2	3	75	--	--	--	75	25	25	25	--	--	--	25	100	2	**3**
	DJ19FEL206	Effective Communication Skills_Laboratory	--	2	--	1	--	--	--	--	--	--	--	--	--	--	25	25	25	25	1	
7	DJ19FEW	Workshop@	--	2	--	1	--	--	--	--	--	--	--	--	--	25	--	25	25	25	1	1@
8	DJ19A1	Indian Knowledge Tradition (Non Credit)$	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			14	**10**	**3**	**22**	--	**400**	--	--	--	**400**	**150**	**150**	**150**	**110**	**115**	**225**	**325**	**725**	**22**	**22**

* Online End sem examination

\# One term test will be online

@ For Chemical Engg. (Div A), Production Engg. (Div C), Mechanical Engg. (Div E), Electronics and Telecommunication Engg. (Div G) and Computer Engg. (Div I)

$ For Electronics Engg. (Div B), Information Technology (Div D), Mechanical Engg. (Div F), Electronics and Telecommunication Engg. (Div H), Computer Engg. (Div J) and Biomedical Engg.&TWFS,J&K,PMSSS (Div K)

Prepared by Checked by Head of the Department Principal

Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Course Structure and Syllabus

of

First Year (Semester II) B. Tech.

(Common for all Programs)

Prepared by: - Board of Studies for FE

Recommended by: - Academic Council of D. J. Sanghvi College of Engineering

Approved by: - Governing Body of D. J. Sanghvi College of Engineering

Revision: 1 (DJ19)

With effect from the Academic Year: 2019-2020

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : II**
Course : Engineering Mathematics-II	**Course Code: DJ19FEC201**
Course : Engineering Mathematics-II Tutorial	**Course Code: DJ19FET201**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**25**
4	**0**	**1***	**5**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				--	--	--	--	**25**	**25**	

Pre-requisite: Knowledge of

1. Methods of integration
2. Methods of differentiation
3. Basics of differential equations.

Objectives:

1. The course is aimed to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.
2. To provide hands on experience in using SCILAB software to handle real life problems.

Outcomes: On completion of the course, learner will be able to:

1. Solve various types of First Order differential equation.
2. Solve various types of Higher Order Differential equation.
3. Illustrate the concepts of Beta and Gamma function, DUIS and rectification.
4. Apply the concepts of Double integral.
5. Apply the concept of Triple integral.
6. Apply the principles of Numerical Method for solving differential equation and numerical integration analytically and using SCILAB also.

Detailed Syllabus: (unit wise)

Unit	**Description**	**Duration**
1	**Beta and Gamma Function, Differentiation under Integral sign and Rectification:** 1.1 Beta and Gamma functions and its properties. 1.2 Differentiation under integral sign with constant limits of integration.	**10**

	1.3. Tracing of curves – Cardioid, Strophoid, Bernoulli's Lemniscate, Astroid, Cycloid, 3D Solids – Sphere, Cone, Cylinder, Paraboloid. 1.4 Rectification of plane curves in Cartesian form. 1.5. Rectification of curve in Parametric and Polar forms.	
2	**Double Integration:** 2.1. Double Integration- Introduction, Evaluation of Double Integrals. (Cartesian & Polar). 2.2. Evaluation of double integrals by changing the order of integration. 2.3. Evaluation of integrals over the given region. (Cartesian & Polar). 2.4. Evaluation of double integrals by changing to polar coordinates. 2.5. Application of double integrals to compute Area and Mass.	**10**
3	**Triple Integration:** 3.1. Triple integration - Introduction and evaluation of integral using Cartesian co – ordinate system. 3.2 Problems of triple integration using cylindrical and spherical polar coordinates 3.3. Application of triple integral to compute volume.	**06**
4	**Differential Equations of First Order and First Degree:** 4.1 Exact differential Equations, Equations reducible to exact form by using integrating factors. 4.2 Linear differential equations (Review), equation reducible to linear form, Bernoulli's equation. 4.3. Simple application of differential equation of first order and first degree to Engineering problem.	**09**
5	**Linear Differential Equations with Constant Coefficients and Variable Coefficients of Higher Order:** 5.1. Linear Differential Equation with constant coefficient- complementary function, particular integrals of differential equation of the type f(D)y = X where X is e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, $e^{ax}V$, xV. 5.2. Method of variation of parameters. 5.3. Cauchy's homogeneous linear differential equation and Legendre's differential equation 5.4. Applications of Higher order differential equation.	**10**
6	**Numerical solution of ordinary differential equations of first order and first degree, and, Numerical Integration:** 6.1. Numerical solution of ordinary differential equation using (a) Euler's method (b) Modified Euler method, (c) Runge-Kutta method of order four (d) Taylor series method. 6.2. Numerical integration- by (a) Trapezoidal rule (b) Simpson's 1/3rd rule (c) Simpson's 3/8th rule (all without proof).	**08**

* Batch wise tutorials are to be conducted.

Books Recommended:

Text books:

1. Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publication
2. Advanced Engineering Mathematics by H. K. Dass, 28th edition, S. Chand 2010.

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern Limited, 9th Ed.
2. Applied Numerical Methods with MATLAB for Engineers and Scientists by Steven Chapra, McGraw Hill.
3. Dennis G. Zill, "A First Course in Differential Equations with Modelling Applications.
4. Thomas & Finney, "Calculus & Analytic Geometry", 9thedition, Addison Wesley.
5. Dennis G. Zill, Warren S. Wright, "Advanced Engineering Mathematics".

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Tutorials: (Details of Term work)

1. Batch wise tutorials are to be conducted.
2. Students must be encouraged to write SCILAB Programs in tutorial class only. Each Student has to write at least 4 SCILAB Programs (including print out) and at least 6 class tutorials on entire syllabus.
3. SCILAB tutorials will be based on (i) Euler's method (ii) Modified Euler method (iii) Runge-Kutta fourth order method (iv) Trapezoidal rule (v) Simpson's $1/3^{rd}$ rule (vi) Simpson's 3/8th rule.

The distribution of marks for term work shall be as follows:

i. Class Tutorials on entire syllabus : **15 marks**
ii. SCILAB Tutorials : **10 marks**

The final certification and acceptance of term work will be subject to satisfactory performance of Tutorials work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

<table>
<tr><td colspan="5">Program: First Year Engineering (All Branches)</td><td colspan="5">Semester : II</td></tr>
<tr><td colspan="5">Course : Engineering Physics-II</td><td colspan="5">Course Code: DJ19FEC202</td></tr>
<tr><td colspan="5">Course : Engineering Physics - II Laboratory & Tutorial</td><td colspan="5">Course Code: DJ19FEL202</td></tr>
<tr><td colspan="4">Teaching Scheme
(Hours / week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>A+B+C</td><td colspan="3">Semester End Examination Marks (A)</td><td colspan="4">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td colspan="2">Avg.</td></tr>
<tr><td colspan="3">75</td><td>25</td><td>25</td><td colspan="2">25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="3">Term work</td><td colspan="2" rowspan="2">Term work Avg.</td><td rowspan="2">25</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">3.5</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project presentation</td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>25</td><td>25</td><td colspan="2">25</td><td>25</td></tr>
</table>

Pre-requisite: Knowledge of Engineering Physics I curriculum along with the basic foundations of physics and mathematics till H.Sc. or equivalent is necessary to comprehend Engineering Physics II course effectively.

Objectives:

1. To obtain a strong hold on basic concepts of Physics that form fundamental principles of technology that prepare students to tackle complex problems faced by society.
2. To provide inclusive knowledge of fundamental physical principles encouraging engineering students to venture in research field

Outcomes: After completion of the course, students would be able to:

1. Apply the foundations of Optics and Photonics in development of modern communication technology.
2. Relate the basics of Electrodynamics which are prerequisite for signal communications, Antenna Theory etc.
3. Comprehend the essential properties of engineering materials for their current and futuristic frontier applications.
4. Interpret and explore basic sensing techniques for physical measurements in modern instrumentation.

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Detailed Syllabus: (Unit wise)

Unit	Description	Duration
1	**OPTICS-II** ***(Prerequisites:*** *Wave front and Huygen's principle, reflection and refraction, diffraction, comparison of Fresnel diffraction and Fraunhoffer diffraction, Absorption, recombination, energy bands of p-n junction, refractive index of a material, Snell's law, Total internal reflection)* • **Diffraction:** Fraunhoffer diffraction at single slit, Diffraction Grating, Absent spectra, Resolving power of a grating; Applications of diffraction grating; Determination of wavelength of light using plane transmission grating. • **Laser:** Spontaneous emission and Stimulated emission; Metastable state, Population inversion, Types of pumping, Resonant cavity, Einsteins's equations; Helium Neon laser; Nd:YAG laser; Semiconductor laser, Applications of laser- Holography. • **Fibre optics**: Structure of optical fibre, Types of optical fibres: Glass fibres, Plastic fibres, Plastic clad silica fibres, Single mode & Multimode, Step index & Graded index, Numerical Aperture for step index fibre.	**8 hrs**
2	**ENGINEERING MATERIALS AND APPLICATIONS** *(Prerequisites: Electrical resistivity and conductivity, Temperature dependence of resistance, Magnetic materials, Crystal physics, Dielectrics and electric polarisation, capacitors and capacitance)* • **Superconductors**: Superconductivity, Critical temperature, Critical magnetic field, BCS theory, Meissner's effect, Type I and Type II and high Tc superconductors; • **Metallic glasses**: Principle, Properties & Applications • **Shape Memory Alloys**: Principle, Properties & Applications • **Non-linear materials**: Principle, Properties & Applications	**7 hrs**
3	**ELECTRODYNAMICS**	**6 hrs**

	(Prerequisites: Coulomb's law-force between two point charges, Electric field, electric field due to a point charge, electric field due to a dipole, Gauss's law, Faraday's law, Cartesian co-ordinate system, Cylindrical co-ordinate system, Spherical co-ordinate system) • Scalar and Vector field, Physical significance of gradient, curl and divergence in Cartesian co-ordinate system, • Gauss's law for electrostatics, Gauss's law for magnetostatics, Faraday's Law and Ampere's circuital law, Divergence theorem, Stoke's theorem • Maxwell's equations (Free space and time varying fields), Plane electromagnetic wave equation in free space, Physical significance and Applications of Maxwell's equations.	
4	**PHYSICS OF SENSORS** ***(Prerequisites:** Transducer concept, meaning of calibration, piezoelectric effect)* • Pressure sensor: Concept of pressure sensing, Capacitive and piezoresistive pressure sensors. • Piezoelectric transducers: Concept of piezoelectricity, use of piezoelectric transducer as ultrasonic generator and application of ultrasonic transducer for distance measurement. • Optical sensor: Photodiode, construction and use of photodiode as ambient light measurement and flux measurement, Pyroelectric sensors	**5 hrs**

List of Laboratory Experiments: (Minimum 5)

1. Determination of wavelength using Diffraction grating. (Hg/Na source)
2. Determination of number of lines on the grating surface using LASER Source.
3. Determination of Numerical Aperture of an optical fibre.
4. Determination of wavelength using Diffraction grating (Laser source)
5. Study of divergence of laser beam
6. Determination of width of a slit using single slit diffraction experiment (laser source)
7. Study of I-V characteristics of Photo diode.
8. Study of ultrasonic distance meter/ interferometer.
9. Simulation experiments based on engineering materials using open source simulation softwares like Avogadro, Chimera, JMOL etc.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. A text book of Engineering Physics-Avadhanulu & Kshirsagar, S. Chand
2. A Text Book of Engineering Physics, S. O. Pillai, New Age International Publishers.
3. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
4. Optics - Ajay Ghatak, Tata Mc Graw Hill
5. Engineering Physics – R K Gaur & S L Gupta, Dhanpat Rai Publications
6. Engineering Physics – Shatendra Sharma & Jyotsna Sharma, Pearson publications
7. Engineering Physics – D. K. Bhattacharya & Poonam Tandon, Oxford publications
8. Engineering Physics – V Rajendran, McGraw Hill Educations
9. Electronic Instrumentation –H.S. Kalsi, Tata Mc Graw-Hill Education

Reference Books:

1. Fundamentals of optics by Jenkins and White, McGrawHill
2. Introduction to Electrodynamics- D. J. Griffiths, Pearson publication
3. Concepts of Modern Physics- Arther Beiser, Tata McGraw Hill
4. Instrumentation & Measurement Techniques by Albert D. Helfrick & William D. Cooper (PHI) Edition
5. Handbook of Modern Sensors Physics design and application- Jacob Fraden, Springer, AIP press.

Evaluation Scheme:

Semester End Examination (A):

Theory:

3. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
4. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory: (Term test: 25 Marks)

4. Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 30% syllabus is completed.

5. Total duration allotted for writing each of the paper is 1 hr.
6. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory & Tutorials: (Term work: 25 Marks)

1. Term work shall consist of Laboratory work and Tutorial sessions.
2. Batch wise laboratory work is to be conducted to develop a rational temperament for scientific observations which lead to constructive inferences essential for technology studies. Students must be encouraged to perform minimum five experiments and submit the laboratory Journal.
3. Class wise tutorial sessions are to be conducted on topics covering entire syllabus for effective interactive sessions focussing on better understanding of the subject. Students must be encouraged to perform minimum 7 tutorials (conducted as Problem solving sessions, Assignments, Power point presentations, Mini Project presentations, Report writing etc) and submit the same.

The distribution of 25 marks for term work shall be as follows:

1. Laboratory work (Performance of Experiments & Journal Documentation): **25 marks**
2. Tutorials: **25 marks**
3. Average of the marks scored in both Laboratory Work & Tutorials will be considered for final term work grading.

The final certification and acceptance of term work will be subject to satisfactory performance and completion of both Laboratory work & Tutorials and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

<table>
<tr><td colspan="7">Program: First Year Engineering (All Branches)</td><td colspan="3">Semester : II</td></tr>
<tr><td colspan="7">Course : Engineering Chemistry-II</td><td colspan="3">Course Code: DJ19FEC203</td></tr>
<tr><td colspan="7">Course : Engineering Chemistry-II Laboratory & Tutorial</td><td colspan="3">Course Code: DJ19FEL203</td></tr>
<tr><td colspan="4">Teaching Scheme
(Hours / week)</td><td colspan="6">Evaluation Scheme</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>A+B+C</td><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td>Total marks (A+ B)</td></tr>
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<tr><td>-</td><td>-</td><td>-</td><td>25</td><td>25</td><td>25</td></tr>
</table>

Pre-requisite: Knowledge of

1. Properties of light and spectrum, wavelength and wave number.
2. Basic electrochemical process and fractional distillation technique

Objectives:

3. To obtain a strong hold on basic concepts of Chemistry that form fundamental principles of technology.
4. To give exposure to recent development in the course related topics.

Outcomes: After completion of the course, students would be able to:

1. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
2. Identify different types of corrosion and suggest control measures in industries.
3. Illustrate the principles of green chemistry and study environmental impact.
4. Analyze the quality of fuel and quantify the oxygen required for combustion of fuel.

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Detailed Syllabus: (Unit wise)

Unit	Description	Duration
1	**Spectroscopic Techniques and Applications:** • Introduction: Definition, electromagnetic radiation (Numerical). Electromagnetic spectrum. • Principle of spectroscopy, Classification of spectroscopy, Types of spectroscopy. • Flame Photometry: Principle, Instrumentation, working, Applications, interferences, advantages and disadvantages. • Jablonski diagram, Introduction to florescence and phosphorescence, application of fluorescence in medicine only.	**5 hrs**
2	**Electrochemistry and Corrosion:** • Introduction- Concept of electrode potential and standard electrode potential, electrochemical and galvanic series, Nernst equation (Numerical). • Mechanism of Corrosion: (I) Dry or Chemical Corrosion: i) Due to oxygen ii) Due to other gases. (II) Wet or Electrochemical corrosion: Mechanism i) Evolution of hydrogen type ii) Absorption of oxygen. • Types of Corrosion: Galvanic cell corrosion, Concentration cell corrosion (differential aeration principle), Pitting corrosion, Intergranular corrosion, Stress corrosion. • Factors affecting the rate of corrosion: (i) Nature of metal, (ii) Nature of corroding environment. • Methods of corrosion control: (I) Cathodic protection: i) Sacrificial anodic protection ii) Impressed current method. (II) Metallic coatings: Hot dipping (tinning and galvanising), metal cladding, metal spraying, cementation. (III) Organic coating: Paint.	**8 hrs**
3	**Green Chemistry and Synthesis of drugs** • Introduction: Definition, significance. • Twelve Principles of Green chemistry. • Conventional and green synthesis of : • (i) Adipic acid, (ii) Indigo, (iii) Carbaryl, (iv) Benzimidazole. • Percentage atom economy (Numericals). • Green fuel: Biodiesel. • Green solvents: CO_2.	**5 hrs**
4	**Fuels and Combustion** • Introduction: Definition, classification, characteristics of a good fuel. • Calorific value: Definition, Units, Gross or Higher calorific value & Net or lower calorific value, Dulong's formula & numerical for calculations of Gross and Net calorific values. • Solid fuels: Analysis of coal- Proximate and Ultimate Analysis (theory and numericals). • Liquid fuels: Petrol- Knocking, Octane number, Cetane number, Antiknocking agents, Power alcohol. • Combustion: Calculations for requirement of only oxygen and air (by weight and by volume only) for given solid & gaseous fuels.	**8 hrs**

List of Laboratory Experiments: (Minimum 5)

1. Determination of Moisture content of coal.
2. Determination of Ash content of coal.
3. Saponification value of oil.
4. Acid value of oil.
5. To estimate the emf of Cu-Zn system by Potentiometry.
6. To determine λmax of a given solution by using UV Spectrophotometer.
7. To validate Beer-Lambert law using UV Spectrophotometer/ colorimeter.
8. To determine metal ion concentration using colorimeter.
9. Determination of Viscosity of oil by Redwood Viscometer.
10. Determination of strength of a given solution (Acid/Base) by using conductometric titration

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Engineering Chemistry - Jain & Jain (DhanpatRai)
2. Engineering Chemistry – Dara &Dara (S Chand)

Reference Books:

1. Green Chemistry: A textbook – V.K.Ahluwalia, Alpha Science International
2. Fundamentals of Molecular Spectroscopy (4th Edition) - C.N.Banwell, Elaine M. McCash, Tata McGraw Hill.
3. Elementary Organic Spectroscopy- Y.R.Sharma, S.Chand and Co.
4. A Text Book of Engineering Chemistry - Shashi Chawla, Dhanpat Rai

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.

2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

Assessment consists of two class tests of 25 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 30% syllabus is completed.

1. Total duration allotted for writing each of the paper is 1 hr.
2. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory & Tutorials:

Term work shall consist of Laboratory work and Tutorial sessions.

1. Batch wise laboratory work is to be conducted to develop a rational temperament for scientific observations which lead to constructive inferences essential for technology studies. Students must be encouraged to perform minimum five experiments and submit the laboratory Journal.
2. Class wise tutorial sessions are to be conducted on topics covering entire syllabus. Students must be encouraged to perform minimum 10 tutorials and submit the same.

The distribution of 25 marks for term work shall be as follows:

1. Laboratory work (Performance of Experiments & Journal Documentation): **25 marks**
2. Tutorials: **25 marks**
3. Average of the marks scored will be considered for final term work grading.

The final certification and acceptance of term work will be subject to satisfactory performance of Laboratory work & Tutorials and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering	**Semester : II**
Course : Engineering Graphics	**Course Code: DJ19FEC204**
Course : Engineering Graphics Laboratory	**Course Code: DJ19FEL204**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				50			**25**	**25**	**25**	**75**
				Laboratory Examination			**Term work**		**Total Term work**	
02	**2**	**--**	**03**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		**25**
				--	**--**	**--**	**25**	**--**	**25**	

Pre-requisite: Knowledge of

1. Basics of geometrical constructions

OBJECTIVES:

1. Students should be able to visualize the objects.
2. They should be able to understand and read drawing.
3. To impart and inculcate proper understanding of the theory of projection.
4. They should be able to present the same.

COURSE OUTCOMES:

Upon completion of this course students will be able to:

1. Recognize the value of engineering graphics, as a language of engineers
2. Construct orthographic views of lines, and basic shapes of solids.
3. Interpret and sketch orthographic and sectional orthographic views of various machine components.
4. Visualize objects, and draw isometric views.
5. Build 2D sketches using Auto CAD.

Module	**Contents**	**Hours**
1	Introduction to Engineering Drawing. Types of Lines, Dimensioning Systems as per IS conventions. **Orthographic projections:-** • Different views of simple machine parts as per the first angle projection method recommended by I.S. • Full Sectional views of Simple Machine parts. •****Drawing of orthographic projections using Auto CAD.** ****Introduction to Auto CAD**: - Basic Drawing and Editing Commands. Knowledge of setting up layers, Dimensioning, Hatching, plotting and Printing.	**01** **06**

2	Isometric Views: Isometric Views/Drawings of blocks (plain and cylindrical, excluding spheres). • ****Drawing of Isometric Views using Auto CAD.**	**04**
3	@ **Engineering Curves: Involute of circle (problems on string only). Cycloid –** Plane cycloid (circle rolling in one direction only).	**02**
4	**Projection of Points and Lines:-**Lines inclined to both the Reference Planes. (Excluding Traces) First Quadrant only.	**03**
5	• ****Projection of Solids:** - (Prism, Pyramid, Cylinder & Cone only) Projections of Solids with the axis inclined to HP and VP. (Exclude Spheres, Composite, Hollow solids and frustum). Use change of position or Auxiliary plane method	**04**
6	@ **Section of solids**: - Sections of Prism, Pyramids, Cylinder &Cone, cut by plane perpendicular to at least one reference plane. (Exclude Curved Section Plane). Use change of position or Auxiliary plane method. @ **Development of Surfaces:-** Lateral surface development of Prism, Pyramid, Cylinder, Cone with section plane inclined to HP or VP only. (Exclude Reverse Development)	**03** **03**

**** Should be covered during Auto CAD Practical.**

@ Should be covered only in Term work. (i.e. Questions will not be asked for the End Semester Examination).

Text Books:-

1. N.D.Bhatt , 'Engineering Drawing', Charotar Publishing House,
3. M.B.Shah & B.C.Rana 'Engineering Drawing', Pearson Education.

Reference Books: -

1. K.Venugopal (2007), 'Engineering Drawing and Graphics + AutoCAD', New Age International Publishers.
2. M.L.Dabhade (2004), 'Engineering Drawing', Vision Publications.
3. Dhananjay A. Jolhe 'Engineering Drawing with an Introduction to AutoCAD', Tata McGraw Hill Education Private Limited.

Evaluation Scheme:

Semester End Examination (A):

AutoCAD

1. Minimum 1 problem on orthographic projection.
2. Minimum 1 problem on sectional orthographic projection.
3. Minimum 1 problem on Isometric view.
4. Minimum 1 problem on Projection of Solid (Prism and Pyramid only).

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a

manual drawing exam and the other can be AutoCAD exam.

2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Component – 1

1. Orthographic projections. (03 problems)
2. Sectional Orthographic projections. (02 problems)
3. Isometric Views. (02 problems)
4. Projection of solids. (02 problems)
5. Section of solids and Development of lateral surfaces. (02 problems)
6. Projection of lines and Engineering Curves. (04 problems)

Component – 2

Assignment on A-3 size sketch book/ sheet (minimum 2 problems on each topic):

1. Orthographic/Sectional Orthographic projections.
2. Isometric Projections.
3. Engineering Curves.
4. Projection of lines.
5. Projection of solids.
6. Section of solids and Development of lateral surfaces.

Component – 3

AutoCAD Printouts of each from:

1. Orthographic Projections – 2 problems.
2. Orthographic Projections with section– 2 problems.
3. Isometric Views – 2 problems.
4. Projection of solids (Prism and Pyramid only) - 2 problems.

The distribution of marks for term work shall be as follows:

Laboratory work (Sheets, Assignment and AutoCAD Printouts): **25 Marks**

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : II**
Course : Computer Programming	**Course Code: DJ19FEC205**
Course : Computer Programming Laboratory	**Course Code**: **DJ19FEL205**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				50			**25**	**25**	**25**	**75**
				Laboratory Examination			**Term work**		**Total Term work**	
2	**2**	**--**	**3**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		**25**
				-	**-**	**--**	**25**	**-**	**25**	

Pre-requisite: None

Objectives:

1. To familiarise the logic of Computer Programming.
2. To provide exposure in developing algorithm, flowchart and thereby writing efficient codes for user defined problem.

Outcomes: On completion of the course, learner will be able to:

1. Illustrate the basic terminology used in computer programming.
2. Illustrate the concept of data types, variables and operators using C.
3. Design and Implement control statements and looping constructs in C.
4. Apply function concept on problem statements.
5. Demonstrate the use of arrays, strings and structures in C.
6. Demonstrate the use of pointers

Detailed Syllabus: (Unit wise)

Unit	**Description**	**Duration**
1	**Algorithm and Flowchart:** **1.1 Algorithm & Flowchart :** Three construct of Algorithm and flowchart: Sequence, Decision(Selection) and Repetition	02
2	**Fundamentals of C-Programming:** **2.1** Character Set, Identifiers and keywords, Data types, Constants, Variables. **2.2 Operators**-Arithmetic, Relational and logical, Assignment, Unary, Conditional, Bitwise, Comma, other operators. Expression, statements, Library Functions, Preprocessor.	04

	2.3 Data Input and Output – getchar( ), putchar( ), scanf( ), printf( ), gets( ), puts( ), Structure of C program.	
3	**Control Structures:** **3.1 Decision making with Branching -** If statement, If-else Statement, Switch case statement, **3.2 Looping** – while , do-while, for **3.3 Nested control structure** **3.4** Continue statement, Break statement, Goto statement.	06
4	**Functions and Parameter:** **4.1Function** -Introduction of Function, Defining a Function, Accessing a Function, Function Prototype, Passing Arguments to a Function, Recursive function **4.2 Storage Classes** –Auto , Extern , Static, Register	06
5	**Arrays, String, Structure :** **5.1 Array**-Concepts, Declaration, Definition, Accessing array element, One-dimensional and Multidimensional array, Passing Arrays to Function **5.2 String**- Basics of String, Functions in string.h, user defined function for string handling **5.3 Structure**- Declaration, Initialization, structure within structure, Operation on structures, Array of Structure.	06
6	**Pointers:** **6.1 Pointer** : Introduction, Definition and uses of Pointers, Address Operator, Pointer Variables, **6.2** Pointer Arithmetic **6.3** Call by value , call by Reference	02

List of Laboratory Experiments:

1. To calculate simple interest taking principal, rate of interest and number of years as input from user. Write algorithm & Draw flowchart for the same.
2. Write a program to find greatest of three numbers using conditional operator. Write algorithm & Draw flowchart for the same.
3. Write a program to check if the year entered is leap year or not. Write algorithm & Draw flowchart for the same.
4. Write a program to calculate roots of a quadratic equation
5. Write a menu driven program to perform add / subtract / multiply / divide based on the users choice. The user will indicate the operation to be performed using the signs i.e. + for addition, - for subtraction and so on. Write algorithm & Draw flowchart for the same.
6. Write a program to find the sum of seven terms using a for loop for the following series: 1/1!+2/2!+3/3!+……..+7/7!
7. Write a program to read a number, reverse the number and display the sum of digits of number.
8. Write a program (using 'for' loop) to display the following asking the user for the number of lines. Write algorithm & Draw flowchart for the same.

A
ABA
ABCBA
ABCDCBA
ABCDEDCBA

9. Write a program to check if the entered number is Armstrong or not. Write algorithm & Draw flowchart for the same.

10. Write a program to display first n elements of Fibonacci series (using 'for')
11. Write a program to find nCr using function. Write algorithm & Draw flowchart for the same.
12. Write a program which will accept n and r and calculate nCr=n!/r!(n-r)! using recursive functions.
13. Write a program to initialize an automatic and static variable and increment it in the function. Call this function thrice and print the value of the variable every time after incrementing.
14. Write a program to implement bubble sorting algorithm for sorting numbers in ascending order Write algorithm & Draw flowchart for the same.
15. Write a program to check whether string is palindrome or not.
16. Write a program to count blank spaces, digits, vowels and consonants in the string.
17. Write a program to multiply two matrices using a function.
18. Define a structure called cricket that will describe the following information –player name, country name best score, batting average. Develop a program that will store information of 25 cricket players around the world using this structure. Also display names of these cricketers in descending order with respect to their batting average.
19. Write a program to swap two numbers using a function. Pass the values to be swapped to this function using call-by-value method and call-by-reference method.
20. Write a program to accept a set of 10 numbers and print the number using pointer

Books Recommended:

Text books:

1. MASTERING C" by K.R.Venugopal and Sudeep R.Prasad , Tata McGraw-Hill Publications.
2. "A Computer Science –Structure Programming Approaches using C", by Behrouz Forouzan, Cengage Learning.
3. Schaum's outlines "Programming with C", by Byron S. Gottfried, Tata McGraw-Hill Publications.

Reference Books:

1 "Basics of Computer Science", by BehrouzForouzan , Cengage Learning .
2 "Programming Techniques through C", by M. G. Venkateshmurthy, Pearson Publication.
3 "Programming in ANSI C", by E. Balaguruswamy, Tata McGraw-Hill Education.
4 "Programming in C", by Pradeep Day and Manas Gosh, Oxford University Press.
5 "Let Us C", by YashwantKanetkar, BPB Publication.

Evaluation Scheme:

Laboratory: (Term work)

Term work shall consist of minimum 20 experiments and 1 application based assignment

The distribution of marks for term work shall be as follows:

Laboratory work (Performance of Experiments): 25 Marks

20 experiments: 20 marks

1 application based assignment: 05 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches)- Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : II**
Course : Effective Communication Skills	**Course Code**: **DJ19FEC206**
Course : Effective Communication Skills- Laboratory	**Course Code**: **DJ19FEL206**

Teaching Scheme (Hours / week)				**Evaluation Scheme**							
A	**B**	**C**	**A+B+C**	**Semester End Examination Marks (A)**			**Continuous Assessment Marks (B)**				**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**		
				75			**25**	**25**	**25**		**100**
				Laboratory Examination			**Term work**			**Term work Avg.**	**25**
2	**2**	**-**	**3**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial /Mini Project presentation**			
				-	**-**	**-**	**25**		**25**		

Pre-requisite:

Basic knowledge of English Language

Objectives:

1. To acquaint the students with appropriate language skills with focus on LSRW
2. To make the learners understand the importance and effective use of non-verbal communication
3. To develop the learner's proficiency in public speaking skills
4. To guide and teach the students to utilize the principles of professional business and technical writing for effective communication in the global world
5. To acquaint the students with Email etiquette for better functioning in the corporate environment.

Outcomes: After completion of the course, students would be able to:

1. Understand the fundamentals of communication and apply them effectively
2. Use grammatically correct sentences in oral and written communication to express their ideas with greater clarity
3. Implement techniques to read, comprehend and summarize content
4. Interpret information they listen to correctly and respond in an appropriate manner
5. Use the principles of business correspondence to draft formal letters and emails
6. Use language effectively to draft technical instructions and description

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**FUNDAMENTALS OF COMMUNICATION** 1.1. Introduction to Theory of Communication • Definition • Objectives • The Process of Communication 1.2. Methods of Communication • Verbal Communication • Non-verbal Communication 1.3. Barriers to Communication • Physical/Environmental • Mechanical • Semantic & Linguistic • Psychological • Socio-Cultural 1.4 Organizational/Corporate Communication • Formal (Upward, Downward and Horizontal) • Informal (Grapevine) • Case Studies	**10**
2	**VERBAL APTITUDE FOR EMPLOYMENT** 2.1. Grammar and Vocabulary • Meaning of Words in Context • Synonyms & Antonyms • Standard Abbreviations • Identifying Common Errors • Subject - Verb Agreement • One Word Substitution • Pairs of Confused Words • Articles • Prepositions	**2**
3	**READING SKILLS** 3.1 Mechanics of Reading 3.2 Undesirable Reading Habits 3.3 Types of Reading	**3**

	3.4 Guidelines for Improving Reading Skills 3.5 Comprehension Techniques 3.6 Summarization (passages, articles and reports)	
4	**LISTENING SKILLS** 4.1 Purpose of Listening 4.2 Process of Listening 4.3 Barriers to Listening 4.4 Techniques for Improving Listening Skills	**2**
5	**BUSINESS CORRESPONDENCE** 5.1**.** Seven Cs of Business Correspondence 5.2. Parts of a Letter 5.3 Format of a Letter (Compete Block/ Full Block) 5.4 Types of Letters (Request, permission and grievance letters) 5.5. Emails • Popularity of Email • Problems in Email Communication • Techniques for Writing Effective Emails • Email Etiquette	**6**
6	**BASIC TECHNICAL WRITING** 6.1. Introduction • Importance and Principles of Technical Writing • Framing Definitions • Difference between Technical Description & Instructions 6.2. Description of a Technical Object/ Process • Definition • Diagram • Discussion of Parts/Characteristics • Working 6.3. Writing User Instructions • User Instructions • Hazard Notations (Note, Warning, Caution and Danger)	**3**
	Total	**26**

Reference Books:

1. Hemphill, P. D., McCormick, D. W., & Hemphill, R. D. (2001). *Business Communication with Writing Improvement Exercises*. Upper Saddle River, NJ: Prentice Hall.
2. Locker, Kitty O. Kaczmarek, Stephen Kyo. (2019). *Business Communication: Building Critical Skills*. Place of publication not identified: Mcgraw-hill.
3. Murphy, H. (1999). *Effective Business Communication*. Place of publication not identified: Mcgraw-Hill.
4. Raman, M., & Sharma, S. (2016). *Technical Communication: Principles and Practice*. New Delhi: Oxford University Press.
5. Kaul, A. (2015). *Effective Business Communication*. Place of publication not identified: Prentice-Hall of India.
6. Rizvi, A. M. (2010). *Effective Technical Communication: A guide for scientists and engineers*. New Delhi: Tata McGraw Hill.
7. Lewis, N. (2014). *Word Power Made Easy*. Random House USA.
8. Sanjay Kumar & Pushp Lata (2018). *Communication skills with CD*. New Delhi: Oxford University Press.
9. Mathew, Shirley (2019). *Communication Skills*. Technical Publication
10. Koneru, A. (2018). *Professional Communication*. McGraw Hill.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Internal Continuous Assessment (B):

Assessment to consist of two class tests of 25 marks each.

- The first class test will be conducted in the form of two public speeches during tutorial sessions
  1. Extempore speech (10 marks; duration 2 mins)
  2. Prepared speech (15 marks; duration 3 mins)
- The second class test will include 80% of the syllabus.
- Duration of the written test will be one hour.

Term Work Marks : 25

Laboratory (to be conducted batch wise) will comprise of activities and assignments on the following topics (Min. 10 sessions)

- Fundamentals of Communication
- Verbal Aptitude for Employment
- Reading Skills

- Listening Skills
- Business Correspondence
- Basic Technical Writing

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : I / II**
Course : Workshop Practice (Laboratory)	**Course Code: DJ19FEW**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				-			-	-	-	-
				Laboratory Examination			**Term work**		**Total Term work**	**25**
--	**2**	--	**1@**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				-	-	--	**25**	-	**25**	

@ Workshop Practice (Laboratory) will be conducted in either semester I or semester II. Credit to be given at the end of the same academic year.

Pre-requisite: None

Objectives:

1. To explain the concepts of industrial safety and the importance of working safely
2. To interpret basic engineering blueprints
3. To understand the use of hand tools in fabrication processes.
4. To understand various fabrication processes and machine protocols.
5. To provide hands-on experience on basic machine tools.

Outcomes: On completion of the course, learner will be able to:

7. Get oriented to an engineering workshop environment and will learn to conduct oneself adhering to the safety norms and set procedures.
8. Get familiarized with various methods of commonly used fabrication techniques and the type of hand tools required to perform such of these techniques.
9. Prepare simple jobs like joints, component of simple shape etc. as per component drawings with reasonable degree of tolerance.

Detailed Syllabus: (Unit wise)

Unit	**Description**	**Duration**
1	**Fitting** Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling, tapping.	**14**
2	**Carpentry** Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood turning and modern wood turning methods.	**14**
3	**Welding** Edge preparation for welding jobs. Arc welding for different job like, Lap welding of two plates, butt welding of plates with simple cover, arc welding to join plates at right angles	**06**

4	**Sheet Metal Practice** Introduction to primary technology processes involving bending, punching and drawing various sheet metal joints, development of joints.	**06**
5	**Plumbing** Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic line involving fixing of a water tap and use of coupling, elbow, tee, and union etc.	**06**
6	**PCB** Layout drawing: Positive and negative, PCB etching and drilling, Tinning and soldering technique.	**06**

List of Laboratory Experiments:

1. To study various types fitting tools and make a V-fitting/T-fitting from the given two M.S pieces.
2. To study various types of carpentry tools and prepare half-lap joint or T-lap joint.
3. To study various welding techniques and make a V-butt or Lap-joint, using the given mild steel pieces by arc welding
4. To study various types of sheet metal tools and make square or rectangular tray.
5. To study plumbing tools and joints, and make one job containing various pipe fitting.
6. To make printed circuit board as per the given drawing.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text books:

1. Mechanical Workshop Practice, 2nd Edition, K.C. John, PHI Learning Pvt.Ltd.2014.
2. Manufacturing Technology-Vol I, 4th Edition, P.N. Rao, Tata McGraw Hill, 2014.
3. Printed Circuit Boards: Design, Fabrication, assembly and testing, 1st Edition, R.S. Khandpur, Tata McGraw Hill, 2005

Reference Books:

1. Manufacturing Processes and Systems,9th Edition, P.F.Ostwald, John Willy &Sons INC. UK, 2008
2. Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment, 3rd Edition, R.P. Singh, IK International Publishing House Pvt. Ltd. 2012

Evaluation Scheme:

Laboratory: (Term work)

Term work shall consist of minimum one main job and two group jobs

The distribution of marks for term work shall be as follows:

Laboratory work (Performance of Experiments): 25 Marks

One main Job (Job No. 1 or Job No. 2) : 15 marks

Two Group Jobs (Any two job from Job No. 3 to Job No.6) : 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for First Year Engineering (All Branches) - Semester II (Autonomous)
(Academic Year 2019-2020)

Program: First Year Engineering (All Branches)	**Semester : I**
Course : Indian Knowledge Tradition	**Course Code: DJ19A1**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				--			--	--	--	--
				Laboratory Examination			**Term work**		**Total Term work**	--
1	--	--	--	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				--	--	--	--	--	--	

Pre-requisite: Nil

Objectives:

1. To impart knowledge about basic principles of thought process, reasoning and inference.
2. To make students aware of Indian Traditional knowledge Systems connecting society and nature.
3. To acquaint students with holistic life style of yogic science and wisdom in modern society with rapid technological advancements and societal disruptions

Outcomes: On completion of the course, learner will be able to:

1. Understand the importance nature and scope of Indian Knowledge Tradition
2. Know the basic structure of Indian Knowledge Tradition.
3. Acquire knowledge about the various systems followed to impart knowledge in ancient and medieval India.
4. Be aware of Yoga system and its impact on health.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to the Indian knowledge system** 1.1. Definition and Nature 1.2. Origin 1.3. Importance	**02**
2	**History of Indian Knowledge System** 2.1 Ancient 2.2 Medieval 2.3 Contemporary	**02**
3	**Basic Structure of Indian Knowledge System** 3.1 Ancient 3.2 Medieval 3.3 Contemporary	**03**
4	**Types of Indian Knowledge System** 4.1. Gurukul 4.2. Vedic 4.3. Modern	**02**

5	**Yoga and Health Care** 5.1. Origin of Yoga 5.2. History of Yoga 5.3. Importance of Yoga	**02**
6	**Case Studies**.	**02**

Course Completion

At the end of the semester, the faculty will certify the student for completion of the course.

Books Recommended:

Suggested Text/Reference Books

1. V.Sivaramakrishnan(Ed.),*Cultural Heritage of India-course material*,Bharatiya Vidya Bhavan, Mumbai. 5thEdition,2014
2. GN Jha (Eng. Trans.), Ed. RN Jha, *Yoga-darshanam with Vyasa Bhashya*, VidyanidhiPrakashan, Delhi2016
3. RN Jha, *Science of Consciousness Psychotherapy and Yoga Practices*, Vidyanidhi Prakashan, Delhi2016

Prepared by Checked by Head of the Department Principal