स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ
नांदेड– ४३१६०६ (महाराष्ट्र)
SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY
NANDED-431606, MAHARASHTRA STATE, INDIA.
Established on 17th September 1994 - Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

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परिपत्रक

सर्व संबधितांना या परिपत्रकान्वये कळविण्यात येते की, प्रस्तुत विद्यापीठाच्या विज्ञान व तंत्रज्ञान विद्याशाखेंर्गत अभियांत्रिकी विषयांच्या Bachelor of Engineering FY Group I आणि Group II चा सोबत जोडल्याप्रमाणे अभ्यासक्रमास शैक्षणिक वर्ष २०१८–१९ पासुन लागु करण्यासाठी मा. कुलगुरू यांनी विद्यापरीषदेच्या वतिने मान्यता प्रदान केली आहे.

तरी उपरोक्त प्रमाणे ही बाब सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

''ज्ञानतीर्थ'' परिसर
विष्णुपूरी, नांदेड.
जा.क्र.शै.०१/Syllabus/२०१८–१९/१०६४
दिनांक : २३/०८/२०१८

स्वा/–
उपकुलसचिव
शैक्षणिक (अभ्यासमंडळे) विभाग,

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) प्राचार्य, सर्व संबंधित अभियांत्रिकी महाविद्यालये, प्रस्तुत विद्यापीठ.
२) संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) कुलसचिव, (निवडणूक व सभा कक्ष) यांचे कार्यालय, प्रस्तुत विद्यापीठ.
४) उपकुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, प्रस्तुत विद्यापीठ. (सदरील परिपत्रक व अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर प्रसारित करावे.)

Curriculum of
First Year (Group I & II)

For

All Branches of
Engineering & Technology

Swami Ramanand Teerth
Marathwada University.

Swami Ramanand Teerth Marathwada University, Nanded

First Year Engineering Revised Syllabus

For Group-I (Revision – 2018)

			Teaching Scheme				Marking Scheme					Total
S. No.	**Sub Code**	**Subject**	**L**	**P**	**T**	**CR**	**PR**	**OR**	**TW**	**MSE**	**ESE**	
1	BSC 01	Engineering Physics	3	2		4	25 @		25	30	70	150
2	BSC 03	Mathematics-I	3		2	4			25	30	70	125
3	ESC 01	Engineering Graphics and Design	1	4		3	50 #		50	30	70	200
4	ESC 02	Electrical Engineering and Energy Science	3	2		4	25 @		25	30	70	150
5	HSMC 01	Development of Life Skills (Audit Course)	1	2		0		25 @	50			075
	Total		11	10	2	15						
	GRAND TOTAL						100	25	175	120	280	700

T – Theory , P– Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination. @ - Internal Examination, # - External Examination * - Online Examination.

Students has to undergo One weeks induction Programme before start of First Semester

Swami Ramanand Teerth Marathwada University, Nanded

First Year Engineering Revised Syllabus

For Group-II (Revision – 2018)

			Teaching Scheme				Marking Scheme					Theory Total
Sr. No	**Sub Code**	**Subject**	**L**	**P**	**T**	**CR**	**PR**	**OR**	**TW**	**MSE**	**ESE**	
1	BSC 02	Engineering Chemistry	3	2	0	4	25 @		25	30	70	150
2	BSC 04	Mathematics-II	3		2	4				30	70	100
3	ESC 03	Programming for Problem solving	2	4		4	25 @		25	30*	70	150
4	HSMC 02	English	2	2		3		25@	25	30	70	150
5	ESC 04	Workshop Practice	1	4		3	50@		50			100
6	HSMC 03	Behavioral Science (Audit Course)	1	2		0		25@	25			050
	Total		12	14	2	18	100	50	150	120	280	700

T – Theory , P– Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination. @ - Internal Examination, # - External Examination * - Online Examination.

Curriculum of
First Year (Group I)

For

All Branches of
Engineering & Technology

Swami Ramanand Teerth
Marathwada University.

BSC 01	Engineering Physics	3L:0T:2P	4 credits

Teaching scheme: (Lectures-3 hours/week: Tutorials- 0: Laboratory- 2 hours/week)

Detail Content :
Module 1

1.1 Electro Magnetic Waves

Introduction, electromagnetic waves, electromagnetic wave equation, Max wells equation for free space, uniform plane wave, electromagnetic energy density, pointing theorem, The pointing vectors, wave prorogation in Lossy medium.

1.2 The Electrons

Motion of charged particles in both electric and magnetic fields simultaneously, Determination of charge to mass ratio of electron, Determination of charge of an electron, Positive rays, Determination of charge to mass ratio of positive rays by Thomson's parabola method.

Module 2

2.1 Interference

Introduction**,** Interference in thin films, film with uniform thickness and varying thickness (wedge shaped thin films), Newton's ring theory and engineering applications (refractive index of liquid, coefficient of expansion of crystal)

2.2 Diffraction

Fraunhoffers diffraction at a single slit, condition for maxima and minima, plane transmission gratting, Bragg's law and Bragg's X – ray spectrometer.

2.3 Polarization

Plan polarized light, plane of vibration, plane of polarization, production of PPL i) by reflection, Brewster's law ii) refraction by double refraction, Nicol prism, difference between ordinary and extra ordinary rays, Quarter and Half wave plates.

Moudle 3

3.1 Superconductivity

Introduction to super conductors, properties (zero resistors, Messner effect, Critical field, critical currents, isotope effect, persistence current) Type – I and Type – II super conductors, BCS theory, Applications (super conducting magnets, transmission lines etc.)

Module 4

4.1 Laser

Ordinary light Vs laser light, spontaneous emission Vs stimulated emission polulation inversion, metastable state active medium, pumping mechanism, ruby lase, He – Ne laser, applications of laser in industry of laser in industry and medicine.

4.2 Fiber Optics

Total internal reflection, construction of optical fiber, acceptance angle and acceptance cone, fractional refractive index change, numerical aperture, applications in sensor and telecommunication, advantages of optical fiber over conducting wires.

Module 5

5.1 Acoustics

Basic requirements for the acoustically good hall, reverberation and time of reverberation, Sabin's formula for reverberation time, factors, affecting the architectural acoustics and its remedy.

5.2 Ultrasonics

Ultrasonic waves, production of ultrasonic waves by piezo – electric oscillators and Magnetostriction oscillators, SONAR & applications of ultrasonic waves (engineering and medical applications)

Module 6

6.1 Non Destructive Testing.

Introduction, Destructive and non – destructive testing, advantages and limitations of NDT, liquid penetrant testing, magnetic particle testing, ultrasonic testing (principle, procedure, advantages)

Terms work / Practicals / Assignments

1. To determine the refractive index of prism by using spectrometer.
2. To determine the disperser power of prism by using spectrometer.
3. To study the speed and propagation of light wave in glass by using spectrometer.
4. To study the polarization of light and to find Brewster angle for given glass.
5. To determine the wavelength of sodium –D line by diffraction grating.

6. To determine the diameter of given wire using interference pattern produced due to wedge shape film.
7. To determine the radius of curvature of Plano-convex lens by using Newton's ring apparatus
8. To determine the wavelength of monochromatic light source by using Newton's apparatus.
9. To determine the concentration of sugar in given sugar solution by using Polari meter.
10. To measure modulus of rigidity of torsional pendulum by dynamic method.
11. To determine wavelength of sodium light by Fresnel's prism experiment.
12. To find the velocity of ultrasonic waves in non-conducting medium by pezo- electric method.
13. To determine the dispersive power and resolving power of plane diffraction grating.
14. To determine frequency of AC supply son meter method.
15. To determine the frequency of electrically driven tuning fork by Melde's experiment.
16. Determination of e/m by Thomson's method.
17. To determine wavelength of light using plane transmission grating.
18. To study characteristics of p-n junction diode.
19. To study characteristics of Zener diode.

Any 12 Practical's form above list.

Reference Books

1. Engineering Physics - Gour and Gupta – (Dhanpatrai Publications)
2. Engineering Physics - Dr. M.N. AvadhanuluDr. P.G. Kshirsagar (S Chand Publication)
3. Modern Physics - G.B. Rajan
4. Fiber optics - Cherins, Tata Mcgrhill Publications
5. Applied Physics - Sanjay Jain & Sunil Pandey, University Press Publicaiotion.

BSC 03	Mathematics I	3L:2T:0P	4 credits

Teaching scheme: (Lectures-3 hours/week: Tutorials- 2: Laboratory- 0 hours/week)

Module 1 : Calculus:

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions, Maxima and minima.

Module 2 : Sequences and series:

Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series,.

Module 3:**Multivariable Calculus (Differentiation)**

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line, Method of Lagrange multipliers; Gradient, curl and divergence.

Module 4: **Multivariable Calculus (Integration)**

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates

Module 5:Matrices

Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
6. Jain &iyyenger, Engg. Mathematics
7. Differential and integral calculus by N. Piskunov
8. Matrix and linear algebra by K.B. Datta
9. Matrices and linear algebra by Hans Schneider

ESC 01	Engineering Graphics and Design	1L:0T:4P	3 credits

Teaching scheme: (Lectures-1 hours/week: Tutorials- 0: Laboratory- 4 hours/week)

Contents :

Module 01-Introduction to Engineering Drawing-

a)Introduction, **b)**use of various drawing instruments, lettering, **c)**layout of drawing sheet ,sizes of the drawing sheets, **d)**different types of lines used in the drawing practice, **e)**dimensioning – linear, angular, aligned system, unidirectional system , parallel dimensioning, chain dimensioning , location dimension and size dimension

Module 02 Projections of Points and Lines:

a) Projections of points in all possible position w.r.t. reference planes, b) Projections of lines when it is perpendicular to one of the reference planes, when line is inclined to one and parallel to other reference plane, line inclined to both reference planes, C) applications of projection of lines and concept of traces of lines.

Module 03 -Projections of Planes and Solid

a)Projection of planes when it is parallel to one of the reference planes, lying in reference plane, when it is perpendicular to one and inclined to other reference plane, when it is inclined to both reference planes, b)Projection of solid when axis is perpendicular to one of the reference planes, whenaxis is inclined to one and parallel to other reference plane, when axis is inclined to both the reference planes, projection of cube, right regular prisms, right regular pyramids, right circular cylinder, right circular cone, tetrahedron, frustum of solids

Module 04 - Orthographic Projections

a)Multi view orthographic projections for parts/patterns with isometric /non-isometric surfaces and circular features and sectional views. b)Reading of orthographic projections and missing lines/views.

Module 05- Isometric Projections

a) Definition of isometric view, projection, isometric scale, non isometric lines, circular features in context of isometric projection. b) Construction of isometric view/projection from given orthographic views.

Module 06 Development of surfaces:

The development of lateral surfaces of prism, pyramid, cone, cylinder transition pieces etc. and parts thereof.

Module 07: Overview of Computer Graphics

listing the computer technologies that impact on graphical communication, Demonstratingknowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Module 08 ***:*** Customization& CAD Drawing

consisting of set up of the drawing page and the printer, including scale settings, Setting up of Modules and drawing limits; ISO and ANSI standards for coordinate dimensioning andtolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, CharotarPublishing House

(ii) Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education

(iii)Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication

(iv) Narayana, K.L. & P Kannaiah (2008), Reference Bood on Engineering Drawing, ScitechPublishers

(v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

At the end of the course the student is expected to understand

- Students are able to draw projections of point, line, plane and solid using the fundamental principles
- Students are able to draw development of lateral surfaces

- Students are able to read/interpret the engineering drawing and draw orthographic and isometric views
- Students should be able to draw engineering drawing shapes using CAD software.

List Of Practical's/ Term Work:

1. Identify The different types of Lines in the given object
2. Give the Required dimensions in the given object
3. Draw the projection of points according to given position (Four Problems)
4. Draw the projections of lines when it is perpendicular to one of the reference plane (Two Problems)
5. Draw the projections of lines when it is inclined to one of the reference plane and parallel to other reference plane (Two Problems)
6. Draw the projections of lines when it is inclined to both the reference plane (Two Problems)
7. Draw the projection of plane when it is perpendicular to one of the reference plane and perpendicular to other plane (two Problems)
8. Draw the projection of plane when it is inclined to one of the reference plane and perpendicular to other plane (Two Problems)
9. Draw the projection of plane when it is inclined to both the reference plane (Two Problems)
10. Draw the projection of given solid when the axis is perpendicular to one of the reference plane (Two Problems)
11. Draw the projection of given solid when the axis is inclined to one of the reference plane and parallel to other reference plane(Two Problems)
12. Draw the projection of given solid when the axis is inclined to both the reference plane (Two Problems)
13. Draw the orthographic projection of given object (Two Problems)
14. Draw the missing views in the given orthographic Projection(Two Problems)
15. Draw the isometric projection of given object (Two Problems)
16. Draw the isometric projection of given object using isometric scale (Two Problems)
17. Draw the given mechanism
18. Draw the development of lateral surfaces of the Prism (Two Problems)
19. Draw the development of lateral surfaces of the Pyramid(Two Problems)
20. Draw the development of lateral surfaces of the Cylinder(Two Problems)
21. Draw the development of lateral surfaces of the Cone (Two Problems)

ESC 02	Electrical Engineering and Energy Science	3L:0T:2P	4 credits

Teaching scheme: (Lectures-3hours/week: Tutorials- 0: Laboratory- 2 hours/week)
Contents :

Module 1: D.C. Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems, Time-domain analysis of first-order RL and RC circuits.

Module 2: A.C. Circuits

Representation of sinusoidal waveforms, peak value,average value, RMS values, form factor, crest factor, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance, Three phase voltage and current generation, Three-phase balanced circuits, voltage and current relations in star and delta connections.

Module 3: Single Phase Transformers

Construction, working principle, EMF equation ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.Auto-transformer

Module 4: Electrical Installations

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup. Type of foundation for installation of Machine and Transformer.

Module 5: Energy Sources &conservation

Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries) Concept of Green Building and Green Architecture, LED ratings; Identification of energy related enterprises, Embodied energy

analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption.

Module 6: Energy& Environment

Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy.

Course Outcomes

- To understand and analyze basic Electric circuits
- To analyze single phase ac circuit.
- To understand the concept of electrical installation.
- To understand Concept of Green Building and Green Architecture.

Laboratory Outcomes:

The students are expected to

- Get an exposure to common electrical components and their ratings.
- Make electrical connections by wires of appropriate ratings.
- Understand the usage of common electrical measuring instruments.
- Understand the usage of energy auditing tools.

List of Practical's: (Minimum 10)

1. Basic safety precautions, Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope, Real-life resistors, capacitors and inductors.
2. To Verify Kirchhoff's current law and Voltage law.
3. To Verify Superposition Theorems.
4. To Verify Thevenin Theorems.
5. To Verify Nortons Theorems.
6. Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R-L, and R-C circuits –impedance calculation and verification, Observation of phase differences between current and voltage, Resonance in R-L-C circuits.
7. To Measure Regulation & Efficiency of transformer.

8. Perform Polarity Test on Single phase transformer.

9. Loading of Transformer that is measurement of primary and secondary voltage, current and power.

10. To study the different types of Batteries and their Characteristics.

11. To study the different types of component used in foundation.

12. To study the different types of Earthing (draw a lay out of each Earthing on half imperial sheet)

13. To study different types of energy auditing tools.

Text-Books/Reference-Books:

1) Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010,Tata McGraw Hill.

2) Electrical Circuits & Network by Suresh K.S.

3) A Text book of Basic Electrical Engineering Vol-I By B.L. Thereja, S Chand publication

4) Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010

5)Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press

6) Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press

7) Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaiam

9) Jean-Philippe; Zaccour, Georges (Eds.), (2005),

HMSC 01	Development of Life Skills	1L:0T:2P	Audit Course

Teaching scheme: (Lectures-1hours/week: Tutorials- 0: Laboratory- 2hours/week)

Content Details :

Module -1 Self Analysis :

- To introduce oneself.
- To know one's positive and negative traits.

Module -2 Study Techniques & Information Search :

- To hone reading, listening and note taking skills.
- To search information as per the need.

Module 3 Self Development :

- To set long term, mid-term and short term goals using SMART parameters
- To prioritize the work effectively.
- To cope up with stress effectively

Module 4Interpersonal Skills

- To be able to interact effectively within the family and
- To improve interpersonal relations.

Module -5 Presentation Technique

- To plan and prepare contents for presentation
- Deliver presentation effectively

Module 6Manners and Etiquettes (To be taught through Role Plays and cases studies)

- To be able understand manners and etiquettes
- To communicate effectively

Assignments/ Activities

1. Givingselfintroduction. Observethedemonstrationofselfintroductiongivenbythe teacherandprepareawriteuponthefollowingpointsandintroduceyourselfinfrontof yourbatchin5minutes. Name , Nativeplace , Backgroundofschoolfromwherehe/she passed, Familybackground, Hobbies/salientachievements /idolsifanyforselfdevelopment, Aimsoflifeasan engineer etc.

2. Prepare individual analysis based on SWOT (Strengths, Weakness, Opportunities,

Threats) and present before class. Teacher will suggest measures to improve weaknesses and minimize the threats.

3. Visit the library or download the book from internet and read thoroughly. The book should be on general topic for example, biography of scientist/ social leader/ sports personal/Industrialist/literary figure etc. Present the contents discussed in the book in front of class.

4. Arrange and participate in the interactive panel discussion inviting toppers of class/ seniors to understand the concept of study techniques. Learn study techniques from the toppers and write report on it.

5. Prepare goal worksheet with the help of the teacher and fill it.

6. Prepare individual time table.

7. Form a group of 5-10 students and to work for social cause e.g. tree plantation, blood donation, environment protection, camp on awareness like importance of cleanliness in slum area, social activities like giving clothes to poor etc. (one activity per group). Prepare a report on it.

8. Prepare 10 to 12 power point slides on the general topic (other than technical). Give presentation before class for 10 minutes. You can present the topic either individually or group wise. The group will not be of more than 4 students.

Note : Please note that these are the suggested assignments on given contents/topic. These assignments are the guidelines to the subject teachers. However the subject teacher are free to design any assignment relevant to the topic. The term work will consist of any eight assignments.

Course Outcome

- **a.** Understandandappreciateimportanceoflifeskills.
- **b.** Useself-analysisandapplytechniquestodeveloppersonality.
- **c.** Usedifferentsearchtechniquesforgatheringinformationandworkingeffectively.
- **d.** Improvethepresentationskills.
- **e.** Developabilitytofindhiscapabilities.
- **f.** Selectpropersourceofinformation.
- **g.** Followthetechniqueoftimeandstressmanagement.
- **h.** Setthegoal.

i. Followthepresentationofbodylanguage.

j. Workoninternetandsearchforinformation.

Reference Books

- Barun K. Mitra, *Personality Development and Soft Skills*, Oxford University Press, New Delhi, 2011.
- Ros Jay and Antony Jay, *Effective Presentation*, Person.
- NitinBhatnagar and MamtaBhatnagar, *Effective Communication and Soft Skills*, Person.
- Jeft Keller, *Attitude is everything*, Collins, 2015.

9. LEARNING WEBSITES

- www.mindtools.com
- http://www.quickmba.com/strategy/swot/
- http://en.wikipedia.org/wiki/SWOT_analysis
- www.businessball.com/presentation.htm
- www.lifepositive.com
- http://stress.about.com
- http://www.presentation-skills.biz

Curriculum of
First Year (Group II)
For

All Branches of
Engineering & Technology

Swami RamanandTeerth
Marathwada University.

BSC 02	Engineering Chemistry	3L:0T:2P	4 credits

Teaching scheme: (Lectures-3 hours/week: Tutorials- 0: Laboratory- 2 hours/week)
Detailed contents

Module 1. Atomic and molecular structure (12 lectures)

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots ofthese functions to explore their spatial variations. Molecular orbitals of diatomicmolecules and plots of the multicenter orbitals. Equations for atomic and molecularorbitals. Energy level diagrams of diatomic. Pi-molecular orbitals of butadiene andbenzene and aromaticity. Crystal field theory and the energy level diagrams for transitionmetal ions and their magnetic properties. Band structure of solids and the role of dopingon band structures.

Module 2. Spectroscopic techniques and applications (8 lectures)

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering.

Module 3. Intermolecular forces and potential energy surfaces (4 lectures)

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, HF and HCN and trajectories onthese surfaces. 2

Module 4. Use of free energy in chemical equilibria (6 lectures)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.Acid base, oxidation reduction and solubility equilibria. Water chemistry. Corrosion.Use of free energy considerations in metallurgy through Ellingham diagrams.

Module 5 Periodic properties (4 Lectures)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidationstates, coordination numbers and geometries, hard soft acids and bases, moleculargeometries

Module 6 Stereochemistry (4 lectures)

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity,

absolute configurations and conformational analysis. Isomerism in transitional metal compounds

Module 7 . Organic reactions and synthesis of a drug molecule (4 lectures)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.

Reference Books

(i)University chemistry, by B. H. Mahan

(ii)Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane

(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell

(iv)Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan

(v)Physical Chemistry, by P. W. Atkins

(vi)Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is beingincreasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometerlevels, one has to base the description of all chemical processes at molecular levels. Thecourse will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

(ii)Chemistry Laboratory

Choice of 10-12 experiments from the following:

- Determination of surface tension and viscosity
- Thin layer chromatography
- Ion exchange column for removal of hardness of water
- Determination of chloride content of water
- Colligative properties using freezing point depression
- Determination of the rate constant of a reaction
- Determination of cell constant and conductance of solutions
- Potentiometry - determination of redox potentials and emfs
- Synthesis of a polymer/drug
- Saponification/acid value of an oil
- Chemical analysis of a salt
- Lattice structures and packing of spheres
- Models of potential energy surfaces
- Chemical oscillations- Iodine clock reaction
- Determination of the partition coefficient of a substance between two immiscible liquids
- Adsorption of acetic acid by charcoal
- Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg .

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. Thestudents will learn to:
- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc

BSC 04	**Mathematics II**	**3L:2T:0P**	**4 credits**

Teaching scheme: (Lectures-3 hours/week: Tutorials- 2: Laboratory- 0 hours/week)

Course Content :

Module 1:*First order ordinary differential equations*

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Module 2:*Ordinary differential equations of higher orders*

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Module 3:*Partial Differential Equations – First order*

First order partial differential equations, solutions of first order linear and non-linear PDEs.

Module 4: ***Partial Differential Equations*** – **Higher order**

Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method.

Module 5: *Complex Variable – Differentiation*

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Module 6: *Complex Variable – Integration*

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine

Reference Books :

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
6. Complex Variable and application by Brown
7. . Complex variable by Murray Spiegel
8. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
9. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
10. Linear partial differential equations for scientists and engineers by TynMyint –U LokenathDebnath
11. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993.

ESC 03	**Programming for Problem Solving**	**2L:0T:4P**	**4credits**

Teaching scheme: (Lectures-2hours/week: Tutorials- 0: Laboratory-4 hours/week)

Contents :

Detailed contents

Module *1* Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) - Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code- **(2 lectures)**

Module 2: Conditional Branching and LoopsWriting and evaluation of conditionals and consequent branching Iteration and loops

Module *3*Arrays

Arrays (1-D, 2-D), Character arrays and Strings

Module *4* Basic Algorithms

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots ofequations, notion of order of complexity through example programs (no formal definitionrequired)

Module *5* Function

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Module *6* Recursion

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Module *7* Structure

Structures, Defining structures and Array of Structures

Module *8* Pointers

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Module *9* File handling (only if time is available, otherwise should be done as part of the lab)

Reference Books

(i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

(ii)Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(iii)E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

List of Practical's

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self-referential structures.
- To be able to create, read and write to and from simple text files.

HSMC 02	**English**	**2L:0T:2P**	**3 credits**

Teaching scheme: (Lectures-2hours/week: Tutorials- 0: Laboratory- 2 hours/week)
Contents :

Detailed contents

Module 1. Vocabulary Building

1.1The concept of Word Formation

1.2Root words from foreign languages and their use in English

1.3Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.

1.4Synonyms, antonyms, and standard abbreviations.

Module2. Basic Writing Skills

2.1 Sentence Structures

2.2 Use of phrases and clauses in sentences

2.3 Importance of proper punctuation

2.4 Creating coherence

2.5 Organizing principles of paragraphs in documents

2.6 Techniques for writing precisely

Module3. Identifying Common Errors in Writing

3.1 Subject-verb agreement

3.2 Noun-pronoun agreement

3.3 Misplaced modifiers

3.4 Articles

3.5 Prepositions

3.6 Redundancies

3.7 Clichés

Module 4. Nature and Style of sensible Writing

4.1 Describing

4.2 Defining

4.3 Classifying

4.4 Providing examples or evidence

4.5 Writing introduction and conclusion

Module 5. Writing Practices

5.1 Comprehension

5.2 Précis Writing

5.3 Essay Writing

Module6. Oral Communication

(This Module involves interactive practice sessions in Language Lab)

- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations

Reference Books:

(i)*Practical English Usage.* Michael Swan. OUP. 1995.

(ii)*Remedial English Grammar.* F.T. Wood. Macmillan.2007

(iii)*On Writing Well*. William Zinsser. Harper Resource Book. 2001

(iv)*Study Writing*. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

(v)*Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

(vi)*Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

ESC 04	**Workshop Practice**	**1L:0T:4P**	**3 credits**

Teaching scheme: (Lectures-1 hours/week: Tutorials- 0: Laboratory- 4 hours/week)
Contents :

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining,
2. advanced manufacturing methods
3. Fitting operations & power tools
4. Electrical &Electronics
5. Carpentry
6. Plastic moulding, glass cutting
7. Metal casting
8. Welding (arc welding & gas welding), brazing

Reference Books:

(i)HajraChoudhury S.K., HajraChoudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters andpublishers private limited, Mumbai.

(ii)Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4 th edition, Pearson Education India Edition, 2002.

(iii)Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology – I" Pearson Education, 2008.

(iv)Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.

(v)Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

(ii) Workshop Practice:(60 hours)

1. Machine shop **(10 hours)** One turning job on lathe containing the operations like plain turning, step turning, grooving, knurling, chamfering.One composite job containing the operations like face milling, side and face milling(slotting), drilling / tapping (drilled hole should be perpendicular to slottingoperation).

2. Fitting shop **(8 hours)** Demonstration of different fitting tools and drilling machines and power tools. Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. One simple fitting job (Male/female assembly type) involving practice of chipping, filing, drilling, tapping, cutting etc.

3. Carpentry **(6 hours)**Any one composite job from the following involving different joint, turning and planning, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. Note:1]One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. Max. 4 students. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.

4. Welding shop **(8 hours)**

Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type) Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. Max. 4 students 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.

5. Casting **(8 hours)** Making any 2 different patterns

6. Smithy **(6 hours)** Demonstration of different forging tools and Power Hammer. Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. One job like hook, peg, flat chisel or any hardware item. Note: 1] One job of standard size (Saleable / marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.

Examinations could involve the actual fabrication of simple components, utilizing one or

more of the techniques covered above.

Laboratory Outcomes

 Upon completion of this laboratory course, students will be able to fabricate components with their own hands.

 They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

 By assembling different components, they will be able to produce small devices of their interest.

HSMC 03	**Behavioural Science**	**1L:0T:2P**	**Audit Course**

Teaching scheme: (Lectures-1 hours/week: Tutorials- 0: Laboratory- 2 hours/week)
Contents :

Detailed contents :

Module -1 Leadership &Motivation

a. Meaning and Definition of Leadership

b. Leadership qualities: Confidence, Vision, Communication Skills, influencing people etc.

c. Types of Leadership styles, their advantages and disadvantages – Autocratic, Democratic, Delegative, Bureaucratic and LaizzeFairie.

d. Meaning and Definition of motivation.

e. Types of motivation. Maslow's Motivation theory

Module 2DecisionMaking

a. Importanceofdecisionmaking

b. Definition

c. Characteristicsofgooddecision

d. Typesofdecisions

e. Styles of decision making,

f. Stepsofdecisionmaking

Module 3Team Building

a. Definition & importance of Team

b. Difference between Group and Team

c. Types of team

d. Characteristics of a good team

e. Steps of Team Formation

f. Characteristics of a good team member

g. Different roles of team members

Module -4Task Management

a. Definition & importance

b. Task identification

c. Task planning, organizing and execution

d. Closing the task

Module -5Group Discussion

a. Importance of group discussion

b. Do's and Don'ts of Group Discussion

c. How to initiate & conclude Group Discussion

Module -6 Preparation of Resume / CV

a. Importance of resume in interview.

b. Contents of resume

c. Designing of resume

Module -7Interview Techniques

a. Job Interview: Do's and Don'ts

b. Probable questions for Interview

c. Telephonic or video Interview.

d. Aptitude Test & GD

e. Dress code, Body language and communication skill

Suggested Assignment / Activity

1. Arrange a visit to industry and gather information about organization, product, turnover, work culture, vision and mission statement, quality policy, corporate social responsibility etc and write a report on it.
2. Form a group of 4 to 5 students and conduct group discussion on general / technical topic for 10 to 15 minutes. The student should participate and write an assignment on GD. Prepare the format suggested or designed by the teacher which gives details of GD.
3. Deliver a seminar of 10-12 minutes using presentation aids on the topic given by your teacher.
4. Arrange a guest lecture of H.R. person form industry / expert on interview techniques. The students should prepare report on this activity.
5. Teacher should design, conduct and administer aptitude test of 25 questions based on given areas : verbal aptitude- spelling, verbal aptitude - word meaning, verbal aptitude - word relationships, verbal aptitude - critical reasoning , verbal aptitude - comprehension etc (5 question each). After the test, the teacher should discuss the score and guide the students to find out strong and weak areas. This will help students

to prepare interviews, entrance exams like GATE and other technical / general competitive exams.

6. The same aptitude test 25 question should be conducted based on the areas: numerical computation, numerical estimation, data interpretation, mechanical reasoning, spatial ability, abstract reasoning etc. (5 question each).
7. Preparing a resume for job interview in the suitable format as suggested by the teacher and should be typed while facing the mock interview.
8. Preparing probable questions with the responses that likely to be asked in the job interview. Conduct and face mock interview. Prepare your write up on probable questions with its answers.

Note : Please note that these are the suggested assignments on given contents/topic. These assignments are the guidelines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The term work will consist of any eight assignments.

Course Outcome

- **a.** Useself-motivationandmotivateothers.
- **b.** Buildateamanddevelopteamspiritamongtheteammembers.
- **c.** Improvetheinterpersonalrelationshipskills.
- **d.** LearnProblemsolvinganddecisionmakingskills.
- **e.** Discussaparticulartopicinagroupandfacetheinterview.
- **f.** Performing the stipulated task.

Reference Books :

- Jane Smith, *30 Minutes to Make the Right Decision*, VinodVasishtha, New Delhi, 2003
- Barun K. Mitra, *Personality Development and Soft Skills*, Oxford University Press, New Delhi, 2011
- Edgar Thorpe &Showick Thorpe, *Winning at Interviews,* Pearson , New Delhi,2013
- R.S. Dwivedi, *Human Relations and Organizational Behaviour*, Oxford & IBH, New Delhi

- Jaikishan, Premkishan, *How to crack Test of Reasoning*, Arihant Publications.

Learning Website

- www.psychometric.success.com
- www.mindtools.com
- http://en.wikipedia.org/wiki/motivation