

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-201
(ANALYTICAL SOLID GEOMETRY)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100 (30 internal+70 external)

Unit 1

Sphere, circles, family of spheres Passing through a circle, tangent planes and normal lines to a sphere.

Unit 2

Quadric surfaces: conicoids, their identifications, plane sections. Spherical and cylindrical polar coordinates; their relation with Cartesian coordinates, Jacobian.

Unit 3

Definition of a cone, vertex, guiding curve and generators; equations Cones, enveloping cone of a sphere; conditions for a cone to have three mutually perpendicular generators; tangent lines and plane at point.

Unit 4

Condition for tangency (statement only), reciprocal cones; intersection of two cones with a common vertex, Definition of a cylinder, its equations; enveloping cylinder of a sphere; the right circular cylinder and its equation.

Recommended Texts:

1. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
Chapter 8, Chapter 6(article 3,4 only)
2. Shanti Narayan and Mittal P.K., Analytical solid Geometry, S. Chand And Co. New Delhi, 2002(16th Revised edition). Chapter 7(7.1,7.2,7.3,7.4,7.5,7.7,7.8)
3. Introduction to calculus and differential equations, By D J Karia,
N Y Patel, B P Patel, M L Patel. Article 30 (only)
4. Dipak Chetterjee, Analytic Solid Geometry. Prentice-Hall of India Pvt.Ltd. New Delhi.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-202
(MATRIX ALGEBRA AND DIFFERENTIAL EQUATIONS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

Unit 1

Review of matrix theory, algebra of matrices, special types of matrices, submatrices, determinant and minors of matrices.

Unit 2

Characteristic equation of a matrix; and Cayley-Hamilton theorem, eigenvalue and eigenvector of square matrices, eigenvalue of special type of matrices, The construction of orthogonal matrices.

Unit 3

Linear differential equations with constant coefficients; complementary function and particular integral; operators; Products of operators, Determination of complementary function. Inverse operators; determination of Particular integral and working rules for $f(D)y=e^{mx}$.

Unit 4

Determination of Particular integral and working rules for $f(D)y=X$ where $X= \sin mx, \cos mx, x^m, e^{ax}V, xV$ (where V is a function of x only). Homogeneous linear differential equations. Method of variation of parameters for solving second order nonhomogeneous differential equation.

Recommended Texts:

1. Shanti Narayan and Mittal P.K., A textbook of Matrices, S. Chand and Co. New Delhi, 2005, 11th revised edition.
Chapter 1 (1.4 to 1.9), Chapter 2 (2.1 to 2.5, 2.7 to 2.10),
Chapter 11 (11.1, 11.2 (only statements), 11.3, 11.6, 11.11)
2. Introduction to calculus and differential equations.
-D J Karia, N Y Patel, B P Patel, M L Patel. Article: 63, 64, 65, 66
3. Shanti Narayan. Differential calculus. Fourteenth Edition,
Shamlal charitable trust, New Delhi, 1996
4. Advanced Engineering Mathematics, Fifth Ed.- Kreyszig E. [New Age International Publishing Co.]
5. Higher Engineering Mathematics, Thirty-fifth edition.
Grewal, B.S. [Khanna Publ]

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-203
(PROBLEMS AND EXERCISES IN MATHEMATICS)
FOUR HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

- Integration of rational function of x and a linear surd $(Ax + B)(ax^2 + bx + c)^{-1/2}$ and $(Ax + B)(ax^2 + bx + c)^{1/2}$.
- Reduction formulae for integration of $\sin^n x$, $\cos^n x$, $\sin^p x \cos^q x$
- Solution of System of linear homogeneous algebraic equations
- Solution of System of linear non homogeneous algebraic equations
- Descartes's rule of sign
- Solution of cubic equations (Cardan's method)
- Solution of biquadratic equations (Ferarri's method)
- Spheres
- Sketching of Quadric surfaces
- Cone
- Cylinder
- Rank of a matrix
- Normal form of matrix
- Elementary matrices and its relation with elementary operations
- Inverse of a nonsingular matrix by elementary row operation
- Eigenvalue and eigen vector of square matrices
- General solution of Linear differential equations $f(D)y=X$ where $X= \sin mx, \cos mx, x^m, e^{ax}V, xV$ (where V is a function of x only).

NOTE:-

- Problem solving skill in mathematics is an important aspect in the teaching of mathematics.
- There would be a batch of problem solving session will be of four hours per week and they will be conducted in batches of students of size 25 per batch.

Recommended Texts:

1. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
2. Shanti Narayan. Differential calculus. Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996
3. Shanti Narayan and Mittal P.K., Analytical solid Geometry, S. Chand And Co. New Delhi, 2002
4. Dipak Chatterjee , Analytic Solid Geometry. Prentice-Hall of India Pvt.Ltd. New Delhi.
5. Introduction to calculus and differential equations by D J Karia, N Y Patel, B P Patel, M L Patel
6. Grewal,B.S.,Higher engineering mathematics,Thirty fifth edition, Khanna publ. 2000.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc.
SEMESTER -II
FSELE-201
(MATHEMATICS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internal+70 external)

Unit-1

Limit: Definition & examples(without ϵ - δ), Limit of Polynomial functions, rational functions, trigonometric functions.

Differentiation: Definition and examples, working rule of derivative, chain rule, derivative of inverse function, implicit function, parametric function, exponential function and logarithmic function .

Unit-2

Integration: Definition and examples, method of substitution for integration (trigonometric substitution), Integration by parts.

Unit-3

Definite Integration, Fundamental principle of definite integration.

Unit-4

Differential equations: Definition, Order & degree of differential equation, Solution of differential equation, differential equation of 1st order and 1st degree, variable separable method.

Recommended Texts:

1. College Algebra, 2nd Edition, By Spiegel M.R., Moyer R.E., Tata Macgrow-hill Publishing Co. Ltd.
2. Analytic Calculus, Fuller and Parker.
3. Integral Calculus, By Shanti Narayana, S.Chand Publishing co.,
4. Differential Calculus, By Shanti Narayana, S.Chand Publishing co.,

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-201 (ORGANIC CHEMISTRY)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

UNIT 1 ALKANES AND CYCLOALKANES

[07 hrs]

Introduction, Preparation of Alkanes, The Grignard reagent: An organometallic compound, Coupling of alkyl halides with organometallic compounds, Mechanism of halogenations, Orientation of halogenations, Stability of free-radicals, Nomenclature of selected bicyclic and tricyclic systems, Reactions, reactions of small ring compounds, Baeyer strain theory, Heat of combustion & relative stabilities of cycloalkanes, Orbital picture of angle strain.

UNIT 2 ALKENE AND ALKYNE

[08 hrs]

Dehydrohalogenation of alkyl halide, The E2 mechanism, Evidence for the E2 mechanism. Evidence for the E2 mechanism. Absence of hydrogen exchange, Evidence for the E2 mechanism. The element effect, The E1 mechanism, Heat of hydrogenation & Stability of alkene, Electrophilic addition; Mechanism Electrophilic addition; Orientation & reactivity, Mechanism of addition of halogen Halohydrin formation, Addition of alkene; Dimerization, Addition of alkane; Alkylation Oxymercuration-demercuration, Hydroboration-oxidation, Free-radical addition. Mechanism of peroxide-initiated addition of HBr, Orientation of Free-radical addition, Hydroxylation Ozonolysis, Preparation of alkynes, Hydration of alkynes. Tautomerism Acidity of alkynes, Reaction of metal acetylides, Analysis of alkynes.

UNIT 3 ALKYL AND ARYL HALIDES

[07 hrs]

Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N2 Reaction: Mechanism & kinetics, S_N2 Reaction: Reactivity & steric hindrance, S_N1 Reaction: Mechanism & kinetics, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, S_N2 Vs S_N1 , Reaction, Low reactivity aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzynes, Problems.

UNIT 4 BENZENE AND THEIR DERIVATIVES

[08 hrs]

Aromatic character. The Huckel $[4n+2]$ rule, Effect of substituent group. Determination of relative reactivity, Classification of substituent group, Mechanism of nitration, Mechanism of sulphonation, Mechanism of Friedal-Craft alkylation, Preparation of ketones by Friedal-Craft acylation, Mechanism of halogenations, Reactivity and Orientation, Theory of reactivity, Theory of orientation, Electron release via resonance, Effect of halogen on electrophilic substitution Aromatic-Aliphatic hydrocarbon, Structure & Nomenclature of arenes & their derivatives, Preparation of alkyl benzenes, Limitation of Friedal-Craft alkylation, Reaction of alkylbenzene, Oxidation of alkylbenzenes, Halogenation of alkylbenzene: ring Vs side-chain, Side-chain halogenation of alkylbenzene, Preparation of alkenylbenzenes, Reactions of alkenylbenzenes.

Reference Book:

1. Organic Chemistry by Morrison & Boyd 6th Edition.
2. Organic Chemistry by Paula Yurkanis Bruice, Pearson Education Asia.

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-202 (PHYSICAL CHEMISTRY)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

UNIT 1 Gaseous State [08 hrs]

Kinetic Molecular Theory of Gases, Deviation of Real Gases from Ideal Behaviour, Effect of Temperature and Explanation for the Deviations, Van der waal's Equation of State, Discussion of Van der Wall's Equation, Boyle Temperature, Critical Constant of Gas, Determination of Critical Temperature, Pressure and Volume, Van der waal's Equation and the Critical States, Numerical Problems.

UNIT 2 The Liquid State [07 hrs]

Vapour Pressure, Isoteniscopic method, Surface Tension and Surface Analysis, Effects of Temperature on Surface Tnesion, Capillary rise method an Double Capillary rise Method, Viscosity, The Ostwald's Viscometer Method, Effects of Temperature on Viscosity, Reynolds Number, Refractive Index and its Measurements

UNIT 3 Chemical Thermodynamics [08 hrs]

Terminology of Thermodynamics, Work and Heat, Internal Energy and First Law of Thermodynamics, Measurements of ΔE and ΔH , Hess's Law and its Applications, Heat Capacity and Temperature Dependence of ΔH , Numerical Problems.

UNIT 4 Chemical Kinetics [07 hrs]

Differential Rate Laws, Integrated Rate Laws, Experimental Determination of Rate Laws, Reaction Mechanism and Elementary Process, Mechanism and Rate Laws, Reaction Rates and Equilibria, Temperature Effects, Numerical Problems.

Reference Book:

1. University Chemistry By Bruce H Mahan 4th Edition, Narosa Publishing House.
2. Principles of Physical Chemistry, Puri, Sharma and Pathania, 29th Edition S. Chand and Company.
3. Physical Chemistry By G. M. Barrow
4. Essential of Physical Chemistry by Bahl, Bahl and Tuli, 25th Edition, S. Chand and Company.

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-203 (Chemistry Practicals)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

[A] Volumetric Analysis:

1. To determine the amount of carbonates and bicarbonates in mixture.
2. To determine the molarity and gm/lit of NaOH and Na₂CO₃ in mixture.
3. To determine amount of Fe⁺² by K₂Cr₂O₇ using diphenyl amine as an internal indicator.

[B] Organic Spotting:

Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Acetone, Benzaldehyde, CHCl₃, CCl₄, Methanol, Toluene, Ethylacetate, Aniline, Benzamide, Nitrobenzene. The above compounds must be characterized by M.P. / B.P.

Reference Book:

1. Vogel's textbook of quantitative chemical analysis, 6th Edition, J Mendham, R C Denney, J D Barnes, M J K Thomas.
2. Practical Chemistry, OP Pandey, D N Bajpai, S Giri.
3. An Advanced Course in Practical Chemistry, Ghoshal, Mahapatra, Nad.

SARDAR PATEL UNIVERSITY
Subject
: Physics:
Second Semester
Course No. FSPH-201
(Effective from June – 2010)
Classical Mechanics & Relativity
(Two Credit Course – 2 Hours per week)

UNIT: 1 Vector algebra

Introduction to scalars and vectors, Surface area as a vector, Scalar triple product, Reciprocal vectors, Vector triple product, Gradient of a scalar point function, Divergence of a vector point function, Curl of a vector point function Irrotational and solenoidal vectors, Gauss Theorem, Greens Theorem, Stokes Theorem

UNIT: 2 Mechanics of a particle

Introduction to mechanics, Mechanics of a particle, Equation of motion of a particle, Motion under constant force (Atwood's machine), Motion under force which depends on time only, Motion of a charged particle in electromagnetic field, Motion in a constant electric field, Motion in a constant magnetic field (Derivation of cyclotron frequency), Motion in a crossed fields (Derivation of drift velocity)

UNIT: 3 Simple harmonic motion

Acceleration due to gravity, The simple pendulum, Drawbacks of a simple pendulum, Compound pendulum, Interchangeability of centers of suspension and oscillation, Centre of percussion, Other points, collinear with C.G. about which the time period is the same, Conditions for maximum and minimum time periods, Bar pendulum, Kater's reversible pendulum

UNIT: 4 Special theory of relativity

Frame of reference, Inertial frame of reference, Galilean transformation equation, Luminiferous Ether, Michelson Morley experiment, Einstein's special theory of relativity, Lorentz transformation, Lorentz-Fitzgerald contraction, Time dilation, Mass-Energy equivalence, Energy Momentum relation

Reference Books:

1. Introduction to Classical Mechanics
R. G. Takwale & P. S. Puranik
Tata McGraw-Hill Publishing Company Ltd., New Delhi
2. Elements of properties of matter
D. S. Matur, S. Chand & Co., New Delhi
3. Atomic and Nuclear Physics
N. Subrahmanyam and Brijlal
Revised by Jivan Seshan, S.Chand & Company Ltd, New Delhi

SARDAR PATEL UNIVERSITY
Subject
: Physics:
Second Semester
Course No. FSPH-202
(Effective from June – 2010)
Electronics, Nuclear and Modern Physics
(Two Credit Course – 2 Hours per week)

UNIT: 1 Electronics – 1

V-I characteristics of a PN junction diode

DC power supply: Use of diodes in rectifiers, Half wave rectifier, Full wave rectifier, Ripple factor and rectification efficiency, Performance of half wave rectifier, Performance of full wave rectifier

Filters: How to get better DC, Shunt capacitor filter, Series inductor filter, Choke - input LC filter, The CLC or PI filter

UNIT: 2 Electronics - 2

Diodes: Types of diodes, Signal diodes, Power diodes, Zener diode (Zener effect, Avalanche effect & Voltage regulation), Varactor diodes, Light emitting diodes

Transistor: Introduction to Transistor structure, The working of a transistor Relation between currents in a transistor, DC alpha, Transistor amplifying action, Transistor configurations, Transistor characteristics, Common-Emitter configuration, current relations, relation between alpha and beta, Input and output CE characteristics, Basic CE amplifier circuit, DC load line

UNIT: 3 Nuclear Structure and Nuclear Transformations

Nuclear Transformations: Radioactive decay, Half-life, Radiometric dating

Nuclear Structure: Nuclear composition Atomic masses, nuclear electrons,
Some nuclear properties : spin and magnetic moment, Nuclear magnetic resonance, applications of NMR, **Stable nuclei** : nuclear decay, **Binding energy** : binding energy per nucleon, The strong interaction, Liquid drop model

UNIT: 4 Modern Physics

Introduction to Black body radiation, Wien's Law, Rayleigh-Jeans Law, Planck's Law of Radiation & Special Cases of Planck's Law, Compton effect De Broglie's hypothesis, Davisson and Germer Experiment, Heisenberg's Uncertainty principle, Bohr atom model and its limitations, Wilson-Sommerfeld relativistic atom model, Vector Atom model and associated quantum numbers

Reference Books:

1. Basic Electronics and Linear Circuits
N. N. Bhargava, D.C. Kulshreshtha and S.C. Gupta
Tata McGraw-Hill Ltd., New Delhi
2. Concepts of Modern Physics,
Arthur Baiser, Tata McGraw Hill, New Delhi
3. Atomic Physics
J. B. Rajam, S. Chand & Company Ltd., (7th Edition)

SARDAR PATEL UNIVERSITY
Subject
: Physics (Practicals):
Second Semester
Course No. FSPH-203
(Effective from June – 2010)
(Two Credit Course – 4 Hours per week)

1. γ by bending of beam
2. Bar pendulum
3. Flywheel
4. Resolving power of grating
5. Newton's ring
6. λ by spectral line by diffraction photograph
7. Half wave rectifier with filters(L, C, LC, π)
8. Full wave rectifier with filters(L, C, LC, π)
9. Zener diode as voltage regulator
10. CE transistor characteristics(Input, Output & Transfer)
11. Measurement of self inductance
12. Measurement of capacitance
13. Study of probability distribution for two option system (coins)
14. Vibration magnetometer
15. Simulation of radioactive decay

Note: To provide flexibility, up to the maximum of 20% of total experiments can be replaced/ added to the list by the Board of Studies.

Communication Skills In English-II
(Semester 2)
FSEN-201 2 Credits: 4 hours a week

Internal – 30
External – 70
Total Marks : 100

I Reading: The objectives are to enable the learners

- a) Read to skim and scan through a passage.
- b) Read to get the over all idea, and comprehend the passage.
- c) Reading from a collection of units in a compiled text and the lessons selected from it below.

Book Prescribed:

'Corridors to Communication' by Ranu Vanikar (Orient Longman) (Units 6-10)

II Writing: The objectives are to enable the students to

- a) Write paragraphs on given topics.
- b) Develop points/ideas into longer composition.
- c) Write resume, job applications.

Books Recommended:

- 1) Champa Tickoo and Jaya Sasikumar (2000). 'Writing with a Purpose'. Chennai, OUP
- 2) David Jolly (1988). 'Writing Tasks: An authentic task approach to individual writing needs.' (Cambridge University Press)

III Listening: The objectives are to enable the students to listen and understand

- 1) Narrations, dialogues, talks
- 2) Identify language functions.
- 3) Note making

Books Recommended:

- 1) 'Spoken English' by D Sasikumar and PV Dhamija (with audio cassettes) (Tata McGraw Hill Publication Ltd, new Delhi) (Units 14-27)
- 2) 'On We Go' (A BBC Video Course)

IV Speaking: The objectives are to enable the students to

- a) Use various notions
- b) Give short formal and informal talks, speeches

Books Recommended:

- 1) Grant Taylor. English Conversation Practice. (Tata McGraw Hill, New Delhi)
- 2) R P Bhatnagar and R T Bell (1999) 'Communication in English' (Orient Longman, Hyderabad)

Evaluation:

Reading aloud + Viva (based on the Text)	10 Marks
Listening Comprehension (based on video) (Note making/Note taking)	10 Marks
Speaking: (1) Journal + Project (05 + 05)	10 Marks
Speaking: (2) Group Discussion	05 Marks
Writing: (1) Developing ideas	05 Marks
Writing: (2) Resume writing	10 Marks
Writing: (3) Connectives	05 Marks
Writing; (4) Registers	05 Marks
	<hr/>
	60 Marks

Information and Communication Technology
Semester-2
FSICT-201
(Effective from June – 2010)
Detailed Syllabus

Unit 1

Learning Essential Computer Softwares:

1. Microsoft Office Tools

Word: Creating, Formatting, Saving documents in different types and destinations, identifying and converting file types like .doc, .pdf, .rtf etc

Power Point: Preparation of power point slides, editing and formatting slides and making PPT presentation

Excel: Preparing Excel Workbooks and learning its various functions.

Unit 2

Communication Technologies

1. E-mail: Writing e-mails to single and multiple users, Attaching a file, Marking CC and BCC, Creating exclusive communication groups.
2. LCD Projectors: Using LCD projectors for making an audio-visual presentation
3. Tele/Video Conferencing
4. Blogging and chatting
5. Fax and Mobiles

Unit 3

Internet Usage for E-learning

1. Introduction to Internet and Web Browsers
2. Search engines to locate information, saving web pages, downloading files, (pdf, mp3 etc) and software
3. Open learning sites- Wikipedia, Wikispaces, Wikieducator etc.
4. Open Free wares- Hot Potatoes, Audacity, and Wida.co.uk
5. Advanced Social Networking
6. Web page building with tailor-made website builders provided free by websites like google.com & webs.com

Unit 4

Effects of Using IT

1. Software copyright: Issues and formalities
2. The problem of Hacking and preventive measures
3. Computer virus and Anti-virus
4. Effect of ICT on patterns of employment including areas of work where there is increased unemployment
5. Effect of microprocessor-controlled devices, in the home including their effects on leisure time, social interaction etc
6. Capability and limitation of IT
7. Issues related to information found on net i.e. unreliability, undesirability and the security of data transfer
8. Potential health problems related to constant use of ICT, for example, repetitive strain injury (RSI), neck and back problems, eye problems and some simple strategies for preventing these problems.

Unit 5

Group Project

Students may be divided in small groups to work on projects based on the following:

1. A Power Point presentation based on review of a Website of their choice
2. An exhaustive blog created on issues of current socio-political, cultural, economic relevance
3. Building a web page on given topics with hyperlinks, jpg, mp3 files etc.