

MATHEMATICS



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**HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY
PATAN- 384 265**

**Modified Detailed Syllabus of CBCS PROGRAMME
Pattern for B Sc Mathematics Semester System**

**PROGRAM CODE : HNGU1054
With Effect from June : 2015**

FACULTY : SCIENCE

SUBJECT : MATHEMATICS

CLASS: Bachelor of Science.

SEMESTER : I to VI

TOTAL PAGE 01 T 27 (WITH COURSE STRUCTURE)

DATE : October 18, 2014.




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B Sc in Mathematics : PROGRAMME Structure Under CBCS

With Effect from June : 2015

**M. B. Prajapati, Department of Mathematics,
Hemchandracharya North Gujarat University, Patan-384265.**

Mission: Our mission is to provide opportunities for developing basic-quality mathematical skills and achievement for their betterment of life through scientific and technological development.

Learning outcomes: Four major focusing areas: Logical Reasoning & Motivation; Analysis & Problem solving; Information & Technology Proficiency.

Vision: To Motivate Individuals to excel in the mathematical basic knowledge-driven environment of the 21st century through curriculum and train integrally human resources through teaching. We **Focus** on quality education.

(1) EDUCATIONAL AIMS :

Mathematics is one of the fundamental disciplines in science. It is the basic for all the disciplines. To make education more effective and learner centric, restructurisation of curriculum becomes essential. As a positive step in this direction and in order to respond to the emerging trends in the global scenario, it is decided to introduce the Choice Based Credit System (CBCS) from the academic year 2011-12 and modified it after three years. Under this system, the academic programme becomes student-oriented, relevant, interdisciplinary and flexible.

(2) CONDITIONS FOR ADMISSION :

A candidate who has passed the H Sec-Science Degree examination of the state or any other examinations accepted by the Syndicate as equivalent thereto shall be eligible for admission to this B Sc Programme in Mathematics on full-time basis of study.

INTAKE rules for admission are as per University notification from time to time.

Students are allowed to take admissions to successive semesters under carry over benefit facility as per the norm decided by the university .

(3) **LEARNING OUTCOMES :** The programme leading to this degree provides the opportunities to develop and demonstrate knowledge and understanding in the following areas:

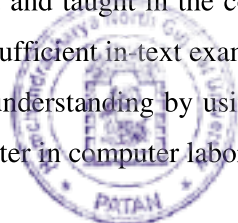
- **Knowledge and understanding :** When one has completed this degree he/she will have knowledge and understanding of the fundamental concepts, principles and techniques from a range of topic areas.
- **Cognitive skills :** When one has completed this degree he/she will be able to understand how to solve some problems using the methods taught and develop abstract mathematical thinking .
- **Practical skills:** When one has completed this degree, he/she will be able to demonstrate the Communicate clearly knowledge, ideas and conclusions about mathematics and improve his/her own learning and performance.

(4) DURATION OF THE COURSE:

The CBCS pattern B. Sc. programme with multidisciplinary approach in Mathematics is offered on a full-time basis. The duration of the course is of three academic years consisting of six semesters each of 15 weeks duration.

(5) TEACHING, LEARNING METHODS :

All relevant material is provided and taught in the course texts and through the study of set books. One will build up knowledge gradually, with sufficient in-text examples to support one's understanding. He/She will be able to assess his/her own progress and understanding by using the in-text problems and exercises at the end of each unit in form of practical using computer in computer laboratory.



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(6) **COURSE OF STUDY :**

The curriculum has five major components:

1. Principle/Core Courses (CC MAT)
2. Practical courses (PC MAT)
3. Elective Opt. Disciplinary courses (ES MAT)
4. Elective Generic course
5. Foundation Course

There are at least 144 Credit COURSEs prescribed in the above classification as per the university norms to be studied to acquire B.Sc. Degree in Mathematics.

⇒ **COURSE STRUCTURE** ☒

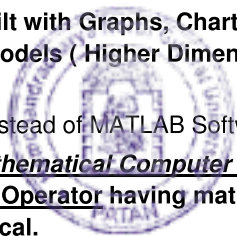
SEMESTER-I Course	Cours es	Credit /course	Teaching Hrs Total	Total Credits	Examination			Total Marks
					Internal	Hours	External	
Principle/Core Courses: CC MAT-111	1	4	4	4	30	3	70	100
Practical/ PC MAT-111	1	2	4	2	-	-	50	50
Elective Opt. Disciplinary: ES MAT –11 Set Theory & Functions	1	2	2	2	-	-	50	50
Elective Generic	1	2	2	2	-	-	50	50
Foundation Course	1	2	2	2	15	1.5	35	50
SEMESTER-II								
Principle/Core Courses: CC MAT-122	1	4	4	4	30	3	70	100
Practical/ PC MAT-122	1	2	4	2	-	-	50	50
Elective Opt. Disciplinary: ESMAT –12 Industrial Mathematics	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-III								
Principle/Core Courses: CC MAT-301	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-302	1	3	3	3	30	3	70	100
Practical/ PC MAT-301	1	1.5	3	1.5	-	-	50	50
Practical/ PC MAT-302	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –21 Business Mathematics-1	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-IV								
Principle/Core Courses: CC MAT-401	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-402	1	3	3	3	30	3	70	100
Practical/ PC MAT-401	1	1.5	3	1.5	-	-	50	50

Practical/ PC MAT-402	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –22 Business Mathematics-II	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-V								
Principle/Core Courses: CC MAT-501	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-502	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-503	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-504	1	3	3	3	30	3	70	100
Practical/PC MAT-501	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-502	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-503	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-504	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –31 Business Mathematics-III	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-VI								
Principle/Core Courses: CC MAT-601	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-602	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-603	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-604	1	3	3	3	30	3	70	100
Practical/PC MAT-601	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-602	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-603	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-604	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –32 Business Mathematics-IV	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50

N.B. :1. *Work-load depends on the number of students and the number of Batches/Groups , for practical and Cognitive-skill based Course.*

2. As the CBCS has a high probability to be operationalised efficiently and effectively for the elevating learners , the Essential Requirements for all Mathematical Practical including MATLAB Practicals of Mathematical subjects are as under:

- 1. Mathematical Laboratory inbuilt with sufficient number of Computers (as per the students enrollments and the number of practical batches) and MATLAB SOFTWARE with basic requirements for the MATLAB Practicals.**
- 2. Mathematical Laboratory inbuilt with Graphs, Charts, Printer, Physical Models (two dimensional as well as three dimensional) & Virtual Models (Higher Dimensional – Computerized) and basic requirements for the same.**
- 3. Use also “PYTHON” Software instead of MATLAB Software.**
- 4. Essential Requirement for Mathematical Computer Laboratory:**
 - (i) Atleast One full time Computer Operator having mathematical ability to run Matlab Software and related Computerized Mathematical Practical.**



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(ii) One Peon for computer laboratory.




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Semester-VI Mathematics

Course: CC MATH-601 (Abstract Algebra)

UNIT : 1 Definition of a Ring and illustrations, Properties of a Ring, Zero divisors and Integral domain, Characteristic of an Integral Ring, Solution of the equation $ax = b$ in a ring R , Subrings, Ideals,

UNIT : 2 Introduction of Polynomials, Integral Domain $D[x]$, Familiar form of Integral domain $D[x]$, Unique factorization of Polynomials, Division Algorithm for Polynomials, Solutions of a Polynomial Equation, Eisenstein Criterion for irreducibility.

UNIT : 3 Quotient ring, Homomorphism of rings, Maximal Ideal, Prime Ideal,

The course is covered by the Book : **I H Sheth, *Abstract Algebra*, Prentice Hall of India (PHI) Publication.** Chapter 13(13.1 to 13.4), Chapter 14(14.1 to 14.4), Chapter 15(15.1 to 15.4), Chapter 16(16.1 to 16.3), Chapter 18(18.1 to 18.7), Chapter 19(19.1 to 19.4),

Reference books :

1. I N Herstein, *Topics in Algebra*, Wiley Eastern Ltd.
2. N. Jacobson, *Basic Algebra Vol I & II*, Hindustan Publishing company
3. Shanti Narayan, *A text book of Modern Algebra*, S.Chand & Co.
4. P.B.Bhattacharya, S.K.Jain, S R Nagpal, *Basics Abstract Algebra, (second Edition)*, Cambridge University Press.
5. N.S. Gopalkrishna, *University Algebra*, Wiley Eastern, New Delhi
6. MacLane Saunders and Birkhoff Garrett, *Algebra*, MacMillan, New York.
7. G.F.Simmons, *Introduction to Topology and Modern Analysis*, MacGrawHill Inc., U.S.A.

Course : CC MATH-602 Mathematical Analysis-II

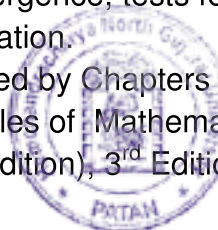
Unit-1 Limits and Continuity: Limits and Continuity for a functions from a metric space into another metric space, continuity of a composite function, Structural properties of continuous functions from a metric space in to R^k , Continuity and Compactness, Continuity and connectedness, Discontinuities, Monotonic function, Discontinuities of a monotonic function, Infinite limits and limits at infinity.

Differentiation: Derivatives of a real function, Continuity and differentiability, Structural properties of the class of differentiable functions, Mean value theorems, Continuity of derivatives, L'Hospital rule, Derivatives of higher order, Taylor's theorem.

Unit-2 The Riemann – Stieltje's Integral: Riemann integral and Stieltje's integral, properties of Riemann integral and Stieltje's integral, Integration and Differentiation, Integration of Vector Valued Functions, Rectifiable curves.

Unit-3 Sequences and Series of functions: Sequences of functions, Limit of a Sequence of functions, Uniform convergence, tests for uniform convergence and continuity, Uniform convergence and differentiation.

The course is roughly covered by Chapters - 4,5,6,7 (Omit 5.16 to 5.20 and 7.28 to 7.33) of The book entitled "Principles of Mathematical Analysis" by Walter Rudin, McGraw Hill (International Student Edition), 3rd Edition.



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Reference books:

- (1) "A First Course in Mathematical Analysis" by D. Somasundaram & B. Choudhary, Narosa Publishing House.
- (2) "Fundamentals of Mathematical Analysis" by G. Das & S. Pattnayak Tata Mcgraw Hill Pub.Co
- (3) "Fundamental of Real Analysis" by S. L. Gupta & Nisha Rani – Vikas Pub. House Pvt. Ltd. New Delhi-1974.
- (4) "Principle of Real Analysis "by S.C.Malik , Wiley Eastern Limited New Delhi 1982.
- (5) "બહુગણ વિધેય" . એમ. ડી. સુથાર . યુનિ. ગ્રંથ નિર્માણ બોર્ડ. અમદાવાદ
- (6) "Principle of Mathematical Analysis" by T.M.Apostol

Course : CC MATH-603 A General TOPOLOGY

Unit-1. Topology and topological spaces, Neighbourhoods, Hausdorff space, Closure of a subset of a topological space.

Unit-2. Interior of a subset of topological space , Boundary of a subset of a topological space, Continuity of a function from topological space to topological space, Homeomorphism between two topological spaces.

Unit-3. Subspace of a topological space, Connectedness of a topological spaces, Some applications of connectedness, Components of a point of connected topological space.

Text-Book: An Introduction to topology, by. Bert Mendelson(third addition)

Ch.No.-3 : 2.1 to 2.4, 3.1, 3.3 , 3.7, 4.2 to 4.15 , 5.1 to 5.7 , 5.9 , 6.1 to 6.3 , 6.5 to 6.8

Ch.No.-4 : 2.1 to 2.7 , 4.1 to 4.3 , 5.1 to 5.7

REFERENCE BOOKS:

- (1) Introduction to Topology and Modern Analysis, by. "G F Symmons", New York McGrawHill, 1963
- (2) General Topology by Kelly J L , New York, Van Nostrand 1955
- (3) Elementary Topology by Beckett D W., New York Academic press, 1967

Course : CC MATH-603 B :Number Theory**Unit I:**

Some Preliminary Consideration: Well-Ordering Principle, Mathematical Induction, the Binomial Theorem & binomial coefficients.

Divisibility Theory: the division algorithm, divisor, remainder, prime, relatively prime, the greatest common divisor, the Euclidean algorithm (Without proof), the least common multiple, the linear Diophantine equation & its solution.

Unit II:

Prime Numbers: Prime and composite number, the Fundamental Theorem of Arithmetic (without proof), canonical form of a number, the Sieve of Eratosthenes.

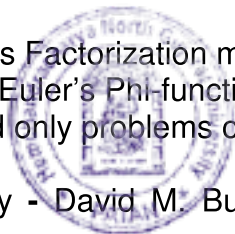
Theory of Congruence: Definition and basic properties of congruence, Residue class & complete system of residues, special divisibility test, linear congruence, Chinese Remainder Theorem. (without proof)

Unit III:

Fermat's Theorem: Fermat's Factorization method, Fermat's little theorem, Wilson theorem, Euler's theorem: Euler's Phi-function $\phi(n)$ and formula for $\phi(n)$, Euler's theorem (without proof) and only problems on Euler's theorem.

Text Book:

Elementary Number Theory - David M. Burton, Sixth Edition, Universal Book stall, New Delhi.



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[(Chapter 1): 1.1 and 1.2 2) 2.1 to 2.4 3) 3.1 and 3.2 4) 4.1 to 4.3 5) 5.2 and 5.3 7) 7.2 and 7.3]

Reference Books:

- 1 An introduction to the Theory of numbers - Niven and Zuckerman, Wiley Eastern Ltd.
- 2 Number Theory - S. G. Telang, Tata Mc Graw-Hill Publishing Company Limited, New Delhi
- 3 Elementary Theory of Numbers - C. Y. Hsiung, Allied Publishers Ltd.-India, ISBN 81-7023-464-6.
- 4 Number Theory - George E. Andrews, Hindustan Publishing Corporation- Delhi.
- 5 Elementary Number Theory - Gareth A. Jones & J. Mary Jones, Springer Verlag, ISBN 81-8128-278-7.
6. Number Theory - J. Hunter, Oliver and Boyd-London.
7. Beginning Number Theory - Neville Robbins, Narosa Pub. House -New Delhi ISBN 978-81-7319-836
- 8 Introduction to the theory of Numbers - G. H. Hardy & E. M. Wright, Oxford Uni. Press
- 9 Higher Algebra - S. Barnard & J. M. Child, Macmillan India Ltd
- 10 Elements of Number Theory - I. M. Vinogradov , Dover Pub INC
- 11 Elementary Number Theory in Nine chapters - James J. Tattersall, Cambridge Uni Press
- 12 A first course in Theory of Numbers - K. C. Chowdhary, Asian Books Pvt Ltd New Delhi
- 13 1001 problems in Classical Number Theory - Jean Marie De Konick Armed Mercier, AMS

Course : CC MATH-604 A GRAPH THEORY

UNIT:1 Graphs, Basic Definitions, Undirected Graphs, Mixed Weighted Graphs, Incidence and Degree, Bipartite Graph and Bipartition, Regular and K-regular Graph, Graph Isomorphisms, Sub Graphs, Graph Operations, Walk, Trail, Paths, Circuits, Connected Graph, Disconnected Graph, Eccentricity, Radius and Diameter, Adjacency Strong, Weak and Unilateral Components, Euler Graphs, Hamilton Paths, Trees, Binary Trees And m-array Tree, Spanning Trees.

UNIT:2 Cut set, Internally Disjoint Paths, Connectivity and Separability, Planar Graphs and their different Representation, Detection Of Planarity, Geometric and Combinatorial duals, Vector Space Associated With a Graph. Circuit and Cut set Subspaces, Orthogonal Vectors And spaces.

UNIT:3 Incidence Matrix, Adjacency Matrix Of a Graph. Path matrix and their relations. Colouring of a Graph, Chromatic Number, Chromatic Partitioning, Covering. Acyclic digraphs and dia cyclizations.

REFERENCE BOOKS :

1. An Introduction To Discrete Mathematics, Udayan M. Prajapati Dr. Ajay S. Gor, Nirav Prakashan
2. Graph Theory with Applications to Engineering and Computer Science by Narsing Deo
3. Discrete Mathematical Structures With Applications to Computer Science by Trembley I.P. And Mahonar R.
4. Graph Theory by Harary F.
5. Graph Theory and its applications by B. Harris
5. Discrete Mathematical Structures With applications to Computer Science by R. Hamming and E.A. Feigenbaum
4. Discrete Mathematical Structures for Computer Science by B. Kolman and R.C. Busy
5. The Essence of Discrete Mathematics by Neville Dean




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Course : CC MATH-604 B Mechanics-II

UNIT-1 Plane Kinematics, Tangential and Normal components of velocity and acceleration, Radial and transverse components. Motion of a rigid body parallel to a plane. Linear momentum and conservation of energy for a particle and for a system of particles. Projectile without resistance.

UNIT-2 Harmonic Oscillators. General motion under central force and Central Orbits, Planetary Orbits. Kepler's laws of motion.

UNIT-3 Moment of inertia. Kinetic energy and angular momentum. Rotation of a rigid body about a fixed axis. General motion of a cylinder parallel to a fixed plane. Compound pendulum. Plane impulsive motion. Impulsive force. Principle of linear and angular momentum. Collision of sphere and coefficient of restitution. Examples.

REFERENCE BOOKS :

- (1) Synge and Griffith: Principal of Mechanics
- (2) S.L.Loney : Statics, Macmillan and company, London.
- (3) R.S.Verma : A Text book on Statics, Pothishala Pvt. Ltd., Allahabad.
- (4) S.L.Loney : An elementary treatise on the Dynamics of a particle and rigid bodies., Cambridge University press 1956.
- (5) Mechanics : Dr. L.K.Patel

Course : CC MATH-604 C Operations Research II

Unit-1. Network Models- Concept of Networks.

Transportation Problem- Introduction, general method of a T.P., unbounded T.P. NWCM, Least cost method, VAM methods to find the initial solution, Dual of a T.P. and MODI method, degeneracy in a T.P., variations in T.P.- Maximization T.P. and prohibited routes.

Assignment Problem- General model of A.P. (A.P. as a special case of a T.P.) Hungarian Method of solving a A.P., variations in a A.P.- maximization, prohibited assignments.

Unit-2. Sequencing Problem :

Methods of sequencing, Johnson's Algorithm for a two machine problem, three machine problem and M-machine problem, Processing Two jobs through M-machines

Unit-3. Game Theory: Introduction, Two-person zero games, Minimax and Maximax principles, saddle point theorems, mixed strategies, method for solution of 2×2 game, dominance principles, solution of games without saddle points by using dominance and then mixed strategies, graphical method of solving $2 \times m$ and $m \times 2$ game, L.P. solution of games.

REFERENCES BOOKS:

- (1) Operations Research , by. J.K.Sharma. Macmillan Publishers India Ltd.
- (2) Operations Research by Nita Shah, Ravi Gor and Hardik Soni, Prentice Hall of India.
- (3) Operations Research(Principles and Practice) by Pradeep Prabhakar Pai, Oxford University Press.



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Semester-VI Mathematics : PC MATH-601-604

Objectives:

- Ensure the student can competently use the MATLAB programming environment
- Understand the capabilities of MATLAB for solving complex mathematical problems
- Understand the tools that are essential in solving real-world problems applying appropriate Mathematical concept.

PCMAT-601 Input-Output Statements in MATLAB Data input, interactive inputs, reading/storing file data, output commands, formatted input-output functions.

PCMAT-602 Programming Techniques Loops, Branches control structures, MATLAB programming, function subprograms, types of functions, function handles, errors and warnings, MATLAB debugger.

PCMAT-603 MATLAB Applications: The content of this unit is to be covered from the list given in Appendix A.

PCMAT-604 Practical using MATLAB programming List of practical is given in Appendix B.

Text Book:

“MATLAB and its Applications in Engineering” Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, Pearson.

coverage from the Text Book:

PCMAT-601 Chapter 5: 5.6

PCMAT-602 Chapter 7: 7.3, Chapter 8: 8.9

PCMAT-603 Appendix A: Table A.1:A.8

PCMAT-604 Appendix B

Appendix A:Table A.1

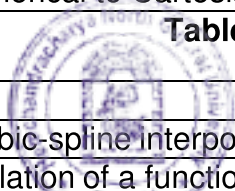
Discrete Math\Number theoretic functions	
factor	Returns Prime factors
factorial	Factorial function
nchoosek	All combinations of N elements taken K at a time
perms	All possible permutations
gcd	Returns the greatest common divisor.
lcm	Returns the least common multiple.
primes	Generate list of prime numbers
isprime	Returns a logical array that is prime numbers.
rat, rats	Returns a rational fraction approximation.
mod	The mod function is useful for congruence relationships. Returns modulus
rem	Returns remainder after division.

Table A.2

Coordinate System Conversion	
cart2sph	Transform Cartesian to spherical coordinates
cart2pol	Transform Cartesian to polar coordinates
pol2cart	Transform polar to Cartesian coordinates
sph2cart	Transform spherical to Cartesian coordinates

Table A.3

Interpolation Functions	
interp1	Linear and cubic-spline interpolations of a function of one variable.
interp2	Linear interpolation of a function of two variables.
spline	Cubic-spline interpolation.



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unmkpp	Computes the coefficients of cubic-spine polynomials.
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Table A.4

Numerical Integration Functions	
quad	Numerical integration with adaptive Simpson's rule.
quadl	Numerical integration with adaptive Lobatto quadrature.
trapz	Numerical integration with the trapezoidal rule.
quadv	Vectorized quadrature
dblquad	Numerically evaluate double integral
triplequad	Numerically evaluate triple integral

Table A.5

Numerical Differentiation Functions	
diff(x)	Computes the difference between adjacent elements in the vector x.
polyder	Differentiates a polynomial, a polynomial product, or a polynomial

Table A.6

ODE Solvers	
ode23	Nonstiff, low-order solver.
ode45	Nonstiff, medium-order solver.
ode113	Nonstiff, variable-order solver.
ode23s	Stiff, low-order.
ode23t	Moderately stiff, trapezoidal rule solver.
ode23b	Stiff, low-order solver.
ode15s	Stiff, variable-order solver.
odeset	Creates integrator options structure for ODE solvers.
deval	Evaluate solution of differential equation problem
bvp4c	Solve boundary value problems for ODEs

Table A.7

Optimization	
fminbnd	Finds minimum of single-variable function.
fzero	Finds zero of single-variable function.
fminsearch	Multidimensional unconstrained nonlinear minimization
lsqnonneg	Linear least squares with nonnegativity constraints
fminunc	Find minimum of unconstrained multivariable function
fmincon	Find minimum of constrained nonlinear multivariable function
linprog	Solve linear programming problems

Table A.8

Statistical Functions	
erf(x)	Computes the error function $erf(x)$.
mean	Calculates the average.
median	Calculates the median.
std	Calculates the standard deviation.
var	Calculates the variance.
corrcoef	Correlation coefficients
cov	Covariance matrix

Appendix B:

1. Numerical Methods Practical (Lab) using MATLAB programming
2. Linear Algebra
3. Graph Theory
4. Calculus



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5. Optimization
6. Problems related to programming given in text book.

Assignment: The work should involve programming using MATLAB. The student should submit the electronic copy of .m files or/and diary file showing the execution/output of Matlab session(s).

N.B.: As the *CBCS* has a high probability to be operationalised efficiently and effectively for the elevating learners, the Essential Requirements for all Mathematical Practical including MATLAB Practicals of Mathematical subjects are as under:

1. **Mathematical Laboratory** inbuilt with sufficient number of Computers (as per the students enrollments and the number of practical batches) and MATLAB SOFTWARE with basic requirements for the MATLAB Practicals.
2. **Mathematical Laboratory** inbuilt with Graphs, Charts, Printer, Physical Models (two dimensional as well as three dimensional) & Virtual Models (Higher Dimensional – Computerized) and basic requirements for the same.
3. Use also “PYTHON” Software instead of MATLAB Software.
4. **Essential Requirement for Mathematical Computer Laboratory:**
 - (i) **Atleast One full time Computer Operator having mathematical ability to run Matlab Software and related Computerized Mathematical Practical.**
 - (ii) **One Peon for computer laboratory.**

Subject Elective Course : Business Mathematics-4

Unit-1 : LPP Formulation & Graphical Method :Introduction, Structure of linear programming, problems, Important terms used in L P Problems, Objective function, constraints, Solution, feasible solution, Basic solution, BFS, Non-degenerate B.F.S, Degenerate solution, Infeasible, Unbounded & Multiple optimal solution, Slack & Surplus variables, Artificial variable, Formulation of LPP & a solution by Graphical method.

Unit-2 : Correlation & Regression analysis :Definition of correlation, positive & negative correlation, Scatter diagram, Carl- Pearson’s coefficient of linear correlation, Properties of correlation coefficients and its examples, regression coefficient, properties of regression coefficient and its examples.

References :

- (1) Operation Research, by J.K.Sharma.
- (2) Business Statistics , by R.S.Bhadyaj
- (3) Business Statistics , by Bharat Jhnujhunwala
- (4) Advanced Practical Statistics, by S.P.Gupta , D.Chand & Co. Ltd, New Delhi.

Paper Style : Semester V & VI For Paper - 501 , 502 , 601 , 602 , 603(A)

Q:1 (Unit-1)

- (a) Theory (6 Marks)
- (b) Theory (6 Marks)
- (c) Example(6 Marks)



Q:1 (Unit-1)

- (a) Theory (6 Marks)
- (b) Theory (6 Marks)
- (c) Example(6 Marks)


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- Q:2 (Unit-2)
(a) Theory (6 Marks)
(b) Theory (6 Marks)
(c) Example

OR

- Q:2 (Unit-2)
(a) Theory (6 Marks)
(b) Theory (6 Marks)
(c) Example (6 Marks)

- Q:3 (Unit-3)
(a) Theory (6 Marks)
(b) Theory (6 Marks)
(c) Example (6 Marks)

OR

- Q:3 (Unit-3)
(a) Theory (6 Marks)
(b) Theory (6 Marks)
(c) Example (6 Marks)

- Q:4 Attempt any two : (8 Marks)
(a) Theory (Unit-1)
(b) Theory (Unit-2)
(c) Theory (Unit-3)

- Q:5 Attempt any two : (8 Marks)
(a) Example (Unit-1)
(b) Example (Unit-2)
(c) Example (Unit-3)

Semester : V Differential Equation CMAT-503

- Q:1 (Unit-1) (a) 6 marks (b) 6 marks (c) 6 marks
OR

- Q:1 (Unit-1) (a) 6 marks (b) 6 marks (c) 6 marks
Q:2 (Unit-2) (a) 6 marks (b) 6 marks (c) 6 marks
OR

- Q:2 (Unit-2) (a) 6 marks (b) 6 marks (c) 6 marks
Q:3 (Unit-3) (a) 6 marks (b) 6 marks (c) 6 marks
OR

- Q:3 (Unit-3) (a) 6 marks (b) 6 marks (c) 6 marks

- Q:4 Attempt any four Out of Six. (Two question from each unit) (16 marks)
(Each question carry FOUR marks.)

Semester : V & VI Operational Research

Paper No. – CCMAT – 504- C & 604-C

- Q:1 (Unit-1) (a) 10 marks (b) 10 marks
OR

- Q:1 (Unit-1) (a) 10 marks (b) 10 marks
Q:2 (Unit-2) (a) 10 marks (b) 10 marks
OR

- Q:2 (Unit-2) (a) 10 marks (b) 10 marks
Q:3 (Unit-3) (a) 10 marks (b) 10 marks
OR

- Q:3 (Unit-3) (a) 10 marks (b) 10 marks
Q:4 (Unit -1,2,3) Attempt any FIVE out of SEVEN. (10 marks)




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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY
PATAN - 384 265
NAAC Accreditation Grade - "B"

FACULTY OF SCIENCE

B. Sc. Programme in BOTANY subject

Under CBCS :: Semester :: Grading Pattern
Syllabus and Examination Scheme for
Semesters V and VI
With effect from
June 2013 and December 2013
respectively

Date: 25/03/2012

Total Pages: 1 to 38



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Syllabus for
B. Sc. (Semester V and VI) programme in
BOTANY
IN FORCE FROM
ACADEMIC YEAR
June 2013 and December 2013

Summary of the Programme

✓ Syllabus duration	Semester pattern i.e., Six months
✓ No. of core compulsory (CC) course	04 (in each semester)
✓ Credits per CC course	03
✓ Total credits for CC course	12/Semester
✓ Theory lectures per CC course	03 / Week
✓ Total Theory lectures for CC course	12 / Week
✓ No. of Practical courses per semester	04 (each from CC course)
✓ Practical lectures	03 /Week/course/batch
✓ Total Practical lectures	12 / Week/ batch
✓ Credits per Practical course	1.5
✓ Total Credits of Practical course	06 /Semester
✓ No. of Practical course (<i>in Uni. Exam.</i>)	03 /Semester
✓ No. of Elective Subjective (ES) course	01 (in each semester)
✓ Credits for ES course	02 (in each semester)
✓ Theory lectures per ES course	02/Week
✓ No. of Elective Generic (EG) course	01
✓ Credits for EG course	02
✓ Theory lectures per EG course	02/ Week
✓ Examination (including Preparation)(weeks)	05
✓ No. of Days per week	06
✓ Weeks (days) available for Teaching	15 (90)
✓ Duration of each lecture (minutes)	55
✓ No. of students/batch	15 (on approval of AC and Exam. unit)



Under Choice Based Credit System-Semester-Grading System pattern

**B. Sc. Programme in Botany
Semester-V and VI**

The 11th Five Year plan of India proposed various measures for academic reforms in higher education. Keeping in view the challenges of the changed times and make the higher education in Indian Universities compatible with the universities in developed nations, the UGC (11th Plan, March 2009) and later on the Association of Indian Universities (AIU) stressed on the following recommendations:

- ❖ Semester System
- ❖ Choice Based Credit System.
- ❖ Curriculum Development
- ❖ Examination Reforms
- ❖ Administrative Reforms

All the above recommendations for reforms have been reviewed in by representatives of various universities in the Gujarat State and considered for implementation with the aim of transforming Higher Education-a **transformation where students change from being passive recipients of knowledge to becoming active participants of the knowledge imbibing process**. The education system in the State thus changes from a teacher-centric to **learner-centric** mode. It should aim at all-round integral development of students' personality so that they become good citizens of the new world order.

Salient Features

CBCS in UG programme in **Botany Semester V and VI** shall be offered from the Academic year **June 2013 and December 2013** respectively.

- ✓ Botany subject in the Universities/Affiliated Colleges shall offer undergraduate programme in Faculty of Science from the Academic year 2011-12.
- ✓ A student will have to get enrolled a **Core course** depending upon his/her requirement of a degree in the said discipline of study. A student will have a choice of selecting an **Elective** as well as **Foundation** courses from a pool of courses.
- ✓ Each course shall be assigned a specific number of **Credits**.
- ✓ A Core course is the course which should compulsorily be studied by a candidate as a Core requirement so as to get degree in a said discipline of study.
- ✓ There shall be four **Core Compulsory** courses (Theory) each with **3 credits** in each semester and their practical's each with **1.5 credits**. Thus, a credit weight-age in **B Sc** programme for each semester core course shall be of **18 credits**. In short, **4.5 credits** multiplied by **4** subjects equal to total of **18 credits**.
- ✓ In addition to the Core courses, a student will have to choose Elective as well as Foundation courses from a pool of courses.
- ✓ **Two** courses of **Elective**, one each from **Generic Elective** and Interdisciplinary / Multidisciplinary / **Subject centric electives** shall have to be offered. The credit weight-age for each Elective course shall be of **02 Credits**. Hence, a total credit weight-age for Elective courses shall be of **4 credits**.
- ✓ One **Foundation** (English Language L.L.) course shall have to be offered. The credit weight -age for Foundation course shall be of **02 credits**.



Each course shall have a unique Course code. The Core courses, Elective courses and the Foundation courses shall be abbreviated respectively as **CC, PC, EG, ES and FC**.

1. Core Compulsory **CC**
Practical Core (Core Elective) **PC**
2. Elective Generic **EG**
Elective Subject **ES**
3. Foundation Compulsory **FC**

Each Academic year shall consist of **two** semesters, each of **15weeks** of teaching equivalent to **90** working days. The Odd semester period shall be from **July to November** and the Even semester period shall be from **December to April**.

The course with **3 credits** shall be of **45 hrs** (15 weeks x 3 credits) duration. The course with **2 credits** shall be of **30 hrs** (15 weeks x 2 credits) duration>

A general framework for Bachelor of Science (B Sc) programme s hall be as follows:

Semester wise credits						Total credits of the Programme
I	II	III	IV	V	VI	
24	24	24	24	24	24	144

The semester wise weight age of core, elective and foundation courses shall be as follows:

Academic year	Core compulsory Courses	Elective courses	Foundation courses
Semester I & II	65-75%	15-20%	10-15%
Semester III & IV	65-75%	15-20%	10-15%
Semester V & VI	65-75%	15-20%	10-15%

Attendance:

The Attendance Rules as per the norms of Hemchandracharya North Gujarat University.

Medium of Instruction:

The Medium of Instruction shall be of **Gujarati medium**. Student is free to write answers either in **Gujarati** and/or **English** language.

Language of Question paper:

Question paper should be drawn in **Gujarati** language and its **English** version should be given.

Evaluation Methods:

1. A student shall be evaluated through Comprehensive Continuous Assessment (**CCA**)/ (**Internal Evaluation**) as well as the **End of Semester examination (External Evaluation)**. The weight-age of CCA shall be 30%, whereas the weight-age of the Semester end examination shall be 70%. There will be **no internal evaluation in practical courses** as well as in **elective courses**.



2. The In Semester assessment (**CCA**)/ (**Internal Evaluation**) is spread through the duration of the course and is to be done by the Teacher teaching the course. BoS of the subjects will decide various criteria and their weight-age for CCA. The assessment is to be done by various means including:

- ✓ Written Tests
- ✓ MCQs based Tests/Quiz
- ✓ Presentations/Seminars
- ✓ Project work/Field work
- ✓ Group discussions/Group activities
- ✓ Assignments, etc.

The distribution of **Internal Evaluation** is given as per criteria given below for **30** marks:

Written Test...	20 marks,
Assignments/MCQs/Very Short questions...	5 marks and
Attendance, Regularity, Punctuality...	5 marks.

3. The **End of Semester examination (External Evaluation)** shall have an assessment based upon following perspective with respect to all the courses:

- ✓ Evaluation with respect to Knowledge
- ✓ Evaluation with respect to Understanding
- ✓ Evaluation with respect to Skill
- ✓ Evaluation with respect to Application
- ✓ Higher Order Thinking Skills

4. There shall be following types of Questions from each unit of the course.

- ✓ MCQs/Fill in the blanks/ Match the pairs, etc
- ✓ Short answer questions
- ✓ Medium answer questions
- ✓ Long answer questions
- ✓ Examples/ Problems, etc.

5. The End of Semester Examination will be conducted by the University. A certified journal of the respective practical course **must be produced** at the time of practical examination by the student.

6. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks for each course shall be **40%** as decided by concern Board of Studies in Botany.

7. Promotion, Re-Admission and Time for Completion of Course, Procedure for Awarding Grades, Provision for Appeal, etc. as decided by the Hemchandracharya North Gujarat University.



Study tour:

Botanical excursion/study tour may be arranged (by the concern faculty with prior permission of **HoD and/or Principal**) within state and/or outside the state to explore/study plant diversity in its natural habitats.

Submission:

Instead of submission of Herbarium sheets and/or specimens at the time of final (Uni.) practical examination student may submit photographs/drawings or CD having such photographs/drawings of plant species to conserve plant species in their natural habitats and to avoid any damage to plant species and its natural habitat.

Selection of Elective (Subjective) course :

For semester-V and VI a common list of three courses is given below. Students are requested to select any one of three courses in Semester-V and then in Semester-VI one course may be selected from the rest of the two courses.

1. ES BOT-301:: *Pharmacognosy of Herbal Drugs*
2. ES BOT-302 :: *Fresh Water Ecology*
3. ES BOT-303 :: *Air Pollution*

Selection of Elective (Generic) course :

For all Semesters-I to VI a separate list consists of new courses of **Elective (Generic)** is given by the University in Paripatra Kramank: 172/2012. Students may select **any one** of the courses as mentioned below for Semester-V and VI separately. As per Paripatra in Semester-V there are **two** courses 1. **Indian constitution** and 2. **Data Base Management System (DBMS)**. In Semester-VI there are **two** courses 1. **Information Technology** and 2. **Naturopathy**.



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN						
B.Sc. three year (General) Programme with 144 credits						
Semester-V and VI in BOTANY w.e.f. June-2013 and December-2013 respectively						
General Pattern/Scheme of study components along with credits						
Study Components	Ins. Hrs/ Week	Examination			Credits	
		Internal Marks	Uni. Exam. Marks	Total Marks		
Semester-V						
	Core Compulsory (CC) Course					
CC-I-7	Core Course-I (Paper-7)	3	30	70	100	3
CC-I-8	Core Course-I (Paper-8)	3	30	70	100	3
CC-I-9	Core Course-II (Paper-9)	3	30	70	100	3
CC-I-10	Core Course-II (Paper-10)	3	30	70	100	3
	Soft-skill: Practical Core (PC) Course					
PC-I-7	Practical Core Course-I (Paper-7)	3		50	50	1.5
PC-I-8	Practical Core Course-I (Paper-8)	3		50	50	1.5
PC-I-9	Practical Core Course-II (Paper-9)	3		50	50	1.5
PC-I-10	Practical Core Course-II (Paper-10)	3		50	50	1.5
	Foundation Course (FC)					
FG-31	Compulsory English (L.L.)	3	30	70	100	2
	Elective Course (EC)					
EG-31	Elective (Generic) Course	2		50	50	2
ES-31	Elective (Subject) Course	2		50	50	2
		30	150	650	800	24
Semester-VI						
	Core Compulsory (CC) Course					
CC-I-11	Core Course-I (Paper-11)	3	30	70	100	3
CC-I-12	Core Course-I (Paper-12)	3	30	70	100	3
CC-I-13	Core Course-II (Paper-13)	3	30	70	100	3
CC-I-14	Core Course-II (Paper-14)	3	30	70	100	3
	Soft-skill: Practical Core (PC) Course					
PC-I-11	Practical Core Course-I (Paper-11)	3		50	50	1.5
PC-I-12	Practical Core Course-I (Paper-12)	3		50	50	1.5
PC-I-13	Practical Core Course-II (Paper-13)	3		50	50	1.5
PC-I-14	Practical Core Course-II (Paper-14)	3		50	50	1.5
	Foundation Course (FC)					
FG-32	Compulsory English (L.L.)	3	30	70	100	2
	Elective Course (EC)					
EG-32	Elective (Generic) Course	2		50	50	2
ES-32	Elective (Subject) Course	2		50	50	2
		30	150	650	800	24



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern

B. Sc. (Semester-V and VI) Programme

Format for Question paper

Core Complementary Course in Botany

Time: **3 Hours**

[w. e. f. June 2013 and December 2013]

Total Marks: **70**

1. Long answered and medium answered/short note-typed questions from each Unit-I **20**
 - a. Long answered questions (Attempt any **two** from **three**, each of **7** marks)
 - b. Medium answered or short note-typed questions (Attempt any **two** from **three**, each of **3** marks)
2. Long answered and medium answered/short note-typed questions from each Unit-II **20**
 - a. Long answered questions (Attempt any **two** from **three**, each of **7** marks)
 - b. Medium answered or short note-typed questions (Attempt any **two** from **three**, each of **3** marks)
3. Long answered and medium answered/short note-typed questions from each Unit-III **20**
 - a. Long answered questions (Attempt any **two** from **three**, each of **7** marks)
 - b. Medium answered or short note-typed questions (Attempt any **two** from **three**, each of **3** marks)
4. Questions such as, MCQs, Fill in the blanks, Match the pairs, very short answered questions, etc. **10**
(Each of **1** Mark) [Total **10**, at least **three** questions from each Unit]

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern

B. Sc. (Semester-V and VI) Programme

Format for Question paper

Elective (Subject) Course in Botany

Time: **2 Hours**

[w. e. f. June 2013 and December 2013]

Total Marks: **50**

1. Long answered and medium answered/short note-typed questions from each Unit-I **20**
 - a. Long answered questions (Attempt any **two** from **three**, each of **7** marks)
 - b. Medium answered or short note-typed questions (Attempt any **two** from **three**, each of **3** marks)
2. Long answered and medium answered/short note-typed questions from each Unit-II **20**
 - a. Long answered questions (Attempt any **two** from **three**, each of **7** marks)
 - b. Medium answered or short note-typed questions (Attempt any **two** from **three**, each of **3** marks)
3. Questions such as, MCQs, Fill in the blanks, Match the pairs, very short answered questions, etc. **10**
(Each of **1** Mark) [Total **10**, **Five** questions from each Unit]

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Semester-VI :: BOTANY:: Core Compulsory

For Semester-end examination there will be
FOUR theory and
THREE practical papers/courses
as mentioned below:

CORE COMPULSORY COURSE

CC-BOT-321

(Molecular Biology, Plant Pathology & Lichens and Angiosperm Families)

CC-BOT-322

(Biochemistry and Plant Physiology)

CC-BOT-323

(Economic Botany, Plant Tissue Culture & Biotechnology and Genetics & Plant Ecology)

CC-BOT-324

(Plant Anatomy and Plant Breeding)

CORE COMPULSORY PRACTICAL COURSE

PC-BOT-321

(Molecular Biology, Plant Pathology & Lichens, Angiosperm Families and Biochemistry)

PC-BOT-322

(Plant Physiology, Plant Breeding)

PC-BOT-323

(Economic Botany, Plant Tissue Culture & Biotechnology, Genetics & Plant Ecology, Plant Anatomy)



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-VI) Programme
Core Compulsory Course in BOTANY

CC-BOT-321 (*Molecular Biology, Plant Pathology & Lichens and Angiosperm Families*)

Theory teaching hours: **3 Hours/week**
Practical teaching hours: **3 Hours/week**

Credit: **3.0**
Credit: **1.5**

Unit-I :: Molecular Biology

- Chemical Nature of Genetic materials: Molecular structure of De -oxy ribo Nucleic Acid-Watson and Crick model, Molecular structure of Ribo Nucleic Acid and Types of RNA.
- Replication of DNA: Mechanism of DNA replication in Eukaryotes and Prokaryotes.
- Transcription: Mechanism of Prokaryotic Transcription, Mechanism of Eukaryotic Transcription.
- Genetic Code and Translation: Genetic Code -Characteristics and Genetic codon/dictionary. Translation-Mechanism of Protein Synthesis.

PRACTICALS

Study through Permanent Slides/Charts/Models/Photographs:

- Watson and Crick's model of DNA / Molecular structure of DNA,
- Types of RNA / Molecular structure of RNA,
- DNA Replication,
- Transcription and
- Translation: Genetic code and Protein synthesis

Reference:

Verma P S and Agarwal (2006) *Cell Biology, Genetics, Molecular Biology, Evolution and Ecology*. S Chand & Company Ltd., New Delhi (1st Multicolour Edition-Reprint).

Unit-II :: Plant Pathology & Lichens

- **Plant Pathology**
 - Defense Mechanisms in Plants: Morphological Defense Mechanism and Biochemical Defense Mechanism.
 - Dissemination of Plant Pathogens: Direct dissemination and Indirect dissemination.
 - ❖ Study of Plant Diseases: Following diseases of Plants, their symptoms, causal organisms, disease cycle and their control measures: 1. Late Blight of Potato 2. Tikka disease of Groundnut and 3. Powdery mildew of Cucurbits.
- **Lichens**: General Characters of Lichens, Classification of the Lichens -Ascolichens and Basidiolichens, Structure of Thallus- Crustose, Foliose and Fruticose and Reproduction of Lichen- Asexual and Sexual.

PRACTICALS

- Plant diseases: Study through **Fresh/Preserved material and Permanent slide**
 - **Late Blight of Potato** - reproductive structure-sporangia
 - **Tikka disease of Groundnut** - reproductive structure-conidia
 - **Powdery mildew of Cucurbits** - reproductive structures
- Study of different specimens: Crustose, Foliose and Fruticose.
- Material/Permanent slide: Thallus of Lichen, Fruiting bodies, T S of Lichen Thallus and V S of fruiting bodies.



References:

- Rangaswami G (1988) Diseases of Crop plants in India, Prentice -Hall of India Pvt. Ltd., New Delhi (3rd Edition).
- Pandey B P (2006) Plant Pathology-Pathogen and Plant Diseases, S Chand & Co. Ltd., New Delhi (1st Edition's Reprint).
- Mehrotra R S (1991) Plant Pathology, Tata McGraw-Hill Publishing Co. Pvt. Ltd., New Delhi (8th Edition's Reprint).
- Agrios George N (2004) Plant Pathology, Academic Press, Reed Elsevier India Pvt. Ltd., New Delhi (4th Edition/ 1st Indian Edition's Reprint).
- Sharma P D (2003) Microbiology and Plant Pathology, Rastogi Publications, Meerut (2nd Edition's Reprint).
- Hait G, Bhattacharya K and Ghosh A K (2008) *A Text Book of Botany, Vol-I*, New Central Book Agency (P) Ltd., Kolkata (1st Edition's Reprint).
- Singh V, Pande P C and Jain D K (2008-09) *A Text Book of Botany*, Rastogi Publications, Meerut (4th Revised Edition's Reprint).
- Sharma P D (2003) *The Fungi*, Rastogi Publications, Meerut (2nd Edition's Reprint).
- Vashishta B R and Sinha A K (2007) *Botany for Degree Students –Fungi*, S Chand & Company Ltd., New Delhi (1st Edition's Revised and Multicolour -Reprint).

Unit-III :: Angiosperm Families

- Classification (as per Bentham and Hooker's system), distinguishing characters, floral formula, floral diagram, common examples of economically important plants of the following families.
 - Dicotyledons:
 - **Polypetalae:** Cruciferae (Brassicaceae), Papaveraceae, Rutaceae.
 - **Gamopetalae:** Sapotaceae, Asteraceae.
 - **Monochlamydae:** Moraceae.
 - Monocotyledons: Cannaceae, Cyperaceae, Poaceae.
- Dichotomous Key
- Angiosperm Taxonomy in relation to anatomy and embryology.

PRACTICALS:

Identify and classify (as per Bentham and Hooker's system) the family giving reasons and Draw diagrams: A flowering twig, L S of Flower, other floral structures, floral formula and floral diagram of locally available plant specimens of families as mentioned below.

Dicotyledons:

Polypetalae: Cruciferae (Brassicaceae), Papaveraceae, Rutaceae.

Gamopetalae: Sapotaceae, Asteraceae.

Monochlamydae: Moraceae.

Monocotyledons: Cannaceae, Cyperaceae, Poaceae.

Prepare dichotomous key with the help of locally available plant species.

References:

- Singh V and Jain D K (2006), *Taxonomy of Angiosperms (2nd edition)*,
- Datta S C (2003), *Systematic Botany*, New Age International L Publishers, N Delhi
- Pandey B.P.(2004) *Text Book Of Botany – Angiosperms*, S Chand & C L,
- Singh V Pande P C and Jain D K (2003) *Taxonomy of Angiosperm*, Rastogi
- Sugbramanyam N.S.(1999) *Modern Plant Taxonomy*, Vikas publishing House.
- Lawrence H M (1951) *Taxonomy of Vascular Plants*, Oxford Publication.
- Sambamurty A V S S (2005) *Taxonomy of Angiosperms, I K International P L, New Delhi*
- Pandey B.P. (2005) *Taxonomy of Angiosperms*, S Chand
- A.S. Foster & E.M. Gifford *Comparative Morphology of Vascular Plants*
- K.R. Sporne *The Morphology of Vascular Plants*
- R.N. Sutar *A Text Book of Systematic Botany*
- Y.D. Tyagi & S.Kshetrapal *An Introduction to Taxonomy of Angiosperms*
- P.C. Vashishta *Taxonomy of Angiosperms*.



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-VI) Programme
Core Compulsory Course in BOTANY
CC-BOT-322 (Biochemistry and Plant Physiology)

Theory teaching hours: **3 Hours/week**
Practical teaching hours: **3 Hours/week**

Credit: **3.0**
Credit: **1.5**

Unit-I :: Biochemistry

- Lipids: Beta-Oxidation of Fatty acid: Activation of Fatty acid, Reaction of Fatty acid. Bio-synthesis of Fatty acid: Acetyl Co-A transport, Production of Malonyl Co-A, The Priming Phase and Elongation Phase.
- Vitamins: Definition, types and significance. Water soluble vitamins: their functions and deficiency disease. Fat soluble vitamins: their functions and deficiency disease.
- Enzymes: Definition, Nomenclature and Classification, Isoenzymes, Properties of Enzymes, Factors influencing action of Enzymes.

PRACTICALS

Major Experiments:

- To determine the effect of different concentration of substrate on enzyme amylase.
- To determine the effect of concentration of enzyme amylase on substrate.

Minor Experiments:

- Estimation of Free Fatty acids from fat/oil by titration method.

Demonstration Experiment:

- Demonstration of respiratory enzymes in plant tissues: Polyphenol oxidase, Dehydrogenase.
- Study of deficiency diseases through charts/photographs.

References:

Deb A C (2008) *Fundamentals of Biochemistry*, New Central Book (P) Ltd., Kolkata(9th Edition Revised).

Jain J L, Jain Sanjaya and Jain Nitin (2005) *Fundamentals of Biochemistry*, S Chand & Co. Ltd., New Delhi(6th Revised Edition).

Unit-II :: Plant Physiology-I

- Translocation of Food in Plants: Phloem sap composition, Mechanism of Phloem transport: Pressure-driven Flow, Factors affecting Translocation,
- Photosynthesis-I: Light Reaction: Introduction, Hill reaction, Plant pigments, Light as a biological agent, Mechanism of Light absorption and emission, Light harvesting and transfer of Energy, Photosynthetic Unit, Red drop and Emerson Enhancement effect, Photosystem I and II. Photo-phosphorylation: Non-cyclic electron flow and Photo-phosphorylation, Cyclic electron flow and Photo-phosphorylation,
- Photosynthesis-II: Path of Carbon in Photosynthesis: C₃ Photosynthetic cycle, C₄ Photosynthetic cycle, Anatomical characteristics of C₄ Plants, Significance of C₄ Cycle, Crassulacean Acid Metabolism (CAM), Significance of CAM, Relationship between C₄ and CAM.



Unit-III :: Plant Physiology-II

- Respiration: Introduction, Glycolysis, Fermentation, Citric Acid Cycle, Oxidative Phosphorylation, Respiratory Quotient, Energy yield of Aerobic respiration.
- Photoperiodism: Definition, critical day length and types of plants [i.e., SDPs, LDPs and Day neutral Plants] and importance of both dark and light periods. Florigen concept and Vernalization.
- Seed Dormancy: Definition, causes of seed dormancy and measures to break seed dormancy.
- Physiological role of Phytohormones i.e., Auxins, Gibberellins, Cytokinins, Abscisic acid and Ethylene.

PRACTICALS

Physiological Experiments to be performed by students.

- Major experiments:
 - To isolate Plant pigments by solvent extraction method using separating funnel.
 - To determine Respiratory Quotient (RQ, i.e., CO₂/O₂) using Ganong's Respirometer.
 - To determine rate of Photosynthesis under varying CO₂ concentration.
 - To determine rate of Photosynthesis under different wavelengths of light.
 - To determine rate of Photosynthesis under various intensity of light.
- Minor experiments:
 - To show the process of Photosynthesis by Simple glass apparatus/Wilmott's Bubbler.
 - To separate Plant pigments using Paper Chromatography.

Physiological Experiments to be demonstrated to the students.

- To demonstrate alcoholic fermentation using Kuhne's tube.
- To demonstrate light is essential using Ganong's light screen.
- To demonstrate CO₂ is essential using Moll's half-leaf experiment.
- To demonstrate food translocation by phloem through ringing experiment.
- To demonstrate Hill's reaction.

References:

- Mukherji S and Ghosh A K (2005) *Plant Physiology*, New Central Book Agency (P) Ltd., Kolkata (1st Central Edition).
Devlin Robert M and Witham Francis H (1986) *Plant Physiology*, CBS Publishers and Distributors, Delhi (4th Edition/ 1st Indian Edition).
Gill P S (), *Plant Physiology* (1st edition)
Ross Salisbury (), *Plant Physiology* (4th edition)
Srivastava H S (2004), *Plant Physiology* (2nd edition)
Sundara Rajan S (), *Plant Physiology* (edition),
Sornathai Annie, Rajakumar K, Jayakumar M and Rajarathinam K (), *Plant Physiology* (edition),
Verma S K and Verma Mohit (), *Plant Physiology, Biochemistry and Biotechnology* (),
Verma V (), *A Text Book of Plant Physiology* (), Emkay Publication, New Delhi.
Sundara Rajan S (2001), *Practical Manual of Plant Ecology and Plant Physiology* (1st edition),
Jain V.K., *Fundamentals of Plant Physiology*
Pandey S.N. and B.K. Sinha, *Plant Physiology*
Verma P.S. and P.K. Agarwal, *Plant Physiology*



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-VI) Programme
Core Compulsory Course in BOTANY

CC-BOT-323 (*Economic Botany, Plant Tissue Culture & Biotechnology and Genetics & Plant Ecology*)

Theory teaching hours: **3 Hours/week**

Credit: **3.0**

Practical teaching hours: **3 Hours/week**

Credit: **1.5**

Unit-I :: Economic Botany

- Introduction, cultivation, scientific name, family, useful part(s), chemical constituents and economic importance of the following plants:
 - **Oil seeds:** Ground nut, Mustard, Sunflower.
 - **Fibres:** Cotton, Jute.
 - **Medicinal Plants:** Root: Ashwagandha. Underground stem: Turmeric. Leaf: Arduisi. Fruit: Amla. Seed: Isabgul.
 - **Dyes:** Henna, Kesudo
 - **Wood:** Timber: Teak and Fire wood: Baval.

PRACTICALS

Give scientific name, family, useful part(s), chemical constituents and economic importance of given plants.

- **Oil seeds:** Ground nut, Mustard, Sunflower.
- **Fibers:** Cotton, Jute.
- **Root:** Ashwagandha, **Underground stem:** Turmeric,
- **Leaf:** Arduisi, **Fruit:** Amla, **Seed:** Isabgul
- **Dyes:** Henna, Kesudo **Timber:** Teak.
- **Fire wood:** Baval.

References:

Singh V, Pande P C and Jain D K (1998) *Anatomy of Seed Plants*, Rastogi Publications, Meerut (1st Edition's Reprint).

Pandey B P (1997) *Plant Anatomy*, S Chand & Co. Ltd, New Delhi. (1st Edition's Reprint).

E John Jothi Prakash (2000) *A Text Book of Plant Anatomy*, Emkay Publications, Delhi. (2nd Revised Edition).

Tayal M S (2001) *Plant Anatomy*, Rastogi Publications, Meerut (5th Edition's Reprint).

Unit-II :: Plant Tissue Culture & Biotechnology

- Plant Tissue Culture-I: Nutrition medium: Media composition - Inorganic nutrients, Carbon and energy source, Vitamins, Growth regulators, Organic supplements, Gelling agents and pH. Sterilization Techniques: Steam sterilization, Dry sterilization and Chemical sterilization of explants.
- Plant Tissue Culture-II: Types of Culture: Embryo culture, Callus culture and Meristem culture.
- Recombination DNA Technology: Gene cloning-I: Basic events in gene cloning, Enzymes for cutting-Restriction Endo-Nuclease-II, Enzymes for joining- DNA ligase, DNA-modifying enzymes-Kinase, Alkaline Phosphatase, DNA Polymerase and Terminal transferase. Linkers and adaptors.
- Recombination DNA Technology: Gene cloning-II: Features of vector, Vectors: Plasmids - pBR322, Cosmids and Bacteriophage-Lemda.



PRACTICALS

- Prepare Nutrition Media for Embryo culture, Callus culture and Meristem culture.
- Learn various sterilization techniques required for explants and media.
- Study of various vectors through charts/diagrams, etc.

References:

Chawla H S (2002) *Introduction to Plant Biotechnology*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi(2nd Edition).

Unit-III :: Genetics & Plant Ecology

▪ Genetics

- Sex Determination and Sex Linkage: Chromosome Theory: Sex-chromosomes and Autosomes, Types of chromosomal mechanisms of Sex-determination. Sex-linkage: Sex-linked inheritance in *Drosophila*, Sex-linked inheritance in Man, Sex-influenced and sex-limited genes.
- Maternal Effects and Cytoplasmic Heredity: Maternal effect. Cytoplasmic Inheritance: Plastid inheritance in *Mirabilis jalapa* and male sterility in corn (*Zea mays*), Respiratory deficiencies.

▪ Plant Ecology

- Energy Flow in the Ecosystems: Single channel Energy model and Y-shaped Energy Flow Model. Bio-geo Chemical Cycles: Carbon, Nitrogen and water cycles.
- Production Ecology: Productivity: Definition, Primary Productivity -GPP and NPP, Measurement of Primary Productivity -Harvest method, Leaf Area Index method and Chlorophyll estimation method. Secondary Productivity.

PRACTICALS

- Study of sex determination, sex linkage, cytoplasmic inheritance through chart/diagram/photographs.
- Solve Genetical problems as per theory syllabus.
- To measure the Primary productivity as per theory syllabus.
- Study of energy models and bio-geo chemical cycles through chart/diagram/photographs.
- Calculation of leaf area index.
- To determine above and below ground Biomass by monolith (25cm x25cm x30cm) method.

References:

Sambamurty (), *Genetics (2nd edition)*,

Rastogi Veer Bala () *A Text Book of Genetics (9th edition)*

Gupta P K (2009), *Genetics (3rd edition)*,

Gupta P K (2007), *Genetics-classical to modern (1st edition)*

Sharma P D (2003) *Ecology and Environment*, Rastogi Publications, Meerut. (7th Edition's Reprint).

Agrawal K C (2001) *Fundamentals of Environmental Biology*, Nidhi Publishers (India), Bikaner. (1st Edition).

Subrahmanyam N S and Sambamurty A V S S (2000) *Ecology*, Narosa Publishing House, New Delhi. (1st Edition).

Kormondy E J (2002) *Concept of Ecology*, Prentice-Hall of India Pvt Ltd., New Delhi(12th Indian Edition Reprint).

Patel B C (2012) *Human Genetics (Manav Janinvignan -in Gujarati)* Gujarat Vishvakosh Trust, Ahmedabad-380 013 (1st edition).



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-VI) Programme
Core Compulsory Course in BOTANY
CC-BOT-324 (Plant Anatomy and Plant Breeding)

Theory teaching hours: **3 Hours/week**
Practical teaching hours: **3 Hours/week**

Credit: **3.0**
Credit: **1.5**

Unit-I :: Plant Anatomy

- Root-Stem Transition: Definition and Types. Anatomy of Special organs: Epiphytic root-Orchid and Aerial/Stilt root-Banyan.
- Anatomy in relation to Taxonomy: Trichomes, Stomata, Epidermis, Internal structure of Leaf, Petiole and Node.
- Methods in Plant Anatomy: Collection of Material, Fixation and Preservation, Dehydration, Infiltration, Embedding and Block making. Sectioning with Microtome, Stains, Staining and Mounting.
- Anomalous Secondary Growth: Stem- *Boerhaavia*, *Achyranthes*, *Dracaena*. Root- *Ipomoea batatas*.

PRACTICALS

- To study the Anomalous Secondary Growth in stems of *Boerhaavia*, *Achyranthes*, *Dracaena* and root of *Ipomoea batatas*.
- To study the Anatomy of Orchid Root (Epiphyte) and Aerial/Stilt Root of Banyan.
- Any 3/more examples which are helpful in Taxonomy of each organ viz., Trichome, Stomata, Epidermis, Node from Plant specimens of allied genera or family.
- Paraffine Block making with Microtomy Technique of any plant material mentioned in Theory syllabus.
- Use of Appropriate Double staining Technique applied for sections embedded in Paraffine Rib bon or hand sections of fresh material as per theory syllabus.

References:

Singh V, Pande P C and Jain D K (1998) *Anatomy of Seed Plants*, Rastogi Publications, Meerut (1st Edition's Reprint).
Pandey B P (1997) *Plant Anatomy*, S Chand & Co. Ltd, New Delhi. (1st Edition's Reprint).
E John Jothi Prakash (2000) *A Text Book of Plant Anatomy*, Emkay Publications, Delhi. (2nd Revised Edition).
Tayal M S (2001) *Plant Anatomy*, Rastogi Publications, Meerut (5th Edition's Reprint).

Unit-II :: Plant Breeding-I

- Introduction: Definition, Origin and evolution of Crop plants: Centres of Origin and Patterns of Evolution. Origin of Crop Plants: Origin of Rice, Wheat, Cotton. Scope and Objectives of Plant Breeding.
- Artificial Vegetative Reproduction: Cutting, Layering, Grafting, Budding, Potting and re-potting. Sexual Reproduction: Apomixis-apospory and apogamy, Significance of Apomixis.
- Selection in Self-pollinated crops: The Pure-line selection - Purpose, Procedure, Merits and Demerits and Achievements. Mass selection - Purpose, Procedure, Merits and Demerits and Achievements. Comparison between Pure line selection and Mass selection.



Unit-III :: Plant Breeding-II

- Breeding Methods: Hybridization: Purpose and General Technique -Choice of Parents, Crossing Schedule, Emasculation and Bagging, Tagging, Pollination, Harvesting and Storing F1 seeds, Raising F1 generation, Selfing, Consequences of hybridization.
- Breeding Methods: Methods in Hybridization: Methods in Self-pollinated crop-Pedigree method: Procedure, and Merits and Demerits and Achievements. Bulk method-Procedure, Merits and Demerits and Achievements. Comparison between Bulk and Pedigree method.
- Hybrid vigour (Heterosis): Definition, its various effects, Causes: Dominance hypothesis and over dominance hypothesis, Achievements, Utilization and limitations.

PRACTICALS

- Preparation of male flowers for hybridization.
- Preparation of female flowers for hybridization.
- Describe the horticulture techniques: Cutting, Layering, Grafting, Budding, Potting and re -potting.
- Study of different methods of plant breeding through Charts/Models/Photographs/Specimens/Herbarium sheet.
- Make a modern new world species from old X new variety breeding with chromosome numbers.

References:

- Kar Dipak Kumar and Halder Soma (2006) *Plant Breeding and Biometry*, New Central Book Agency (P) Ltd. Kolkata(1st Edition).
- Singh B D (2001) *Plant Breeding-Principles and Methods*, Kalyani Publishers, Ludhiana(1st Edition's Reprint).



Seat No. _____

Hemchandracharya North Gujarat University, Patan

Under CBCS-Semester-Grading pattern

B.Sc. (Semester-VI) Programme Practical Examination, April/May-20

Botany Practical - PC-BOT-321

[*Molecular Biology, Plant Pathology, Angiosperm Families and Biochemistry*]

[In force from **December 2013**]

Date: / /20

Time: **5 Hours**]

Place:

[Maximum Marks: **65**

Instruction: Students are requested to follow instructions given by the examiners.

1. Refer to the given specimens **A, B** and **C** to their respective families giving reasons including floral formula and floral diagram. **18**
 2. Perform the Biochemical experiment **D** assigned to you. Tabulate your observations and result. Draw graph if necessary. Show your result and conclusion to the examiner. **10**
 3. Expose the Pathogen from the given plant material **E** and prepare temporary slide. Make a labeled diagram and show your preparation to the examiner. **7**
 4. Identify and describe peculiarities seen in slide/specimen **F**. **6**
 5. Identify and describe peculiarities seen in spot **G** and **H**. **14**
 6. (a) Submission and *viva-voce*. **7**
(b) Journal **3**
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Seat No. _____

Hemchandracharya North Gujarat University, Patan

Under CBCS-Semester-Grading pattern

B.Sc. (Semester-VI) Programme Practical Examination, April/May-20

Botany Practical - PC-BOT-322

[*Plant Physiology and Plant Breeding*]

[In force from **December 2013**]

Date: / /20

Time: **5 Hours**]

Place:

[Maximum Marks: **65**

Instruction: Students are requested to follow instructions given by the examiners.

1. Perform the Physiological experiment **A** assigned to you. Tabulate your observations and result. Draw graph if necessary. Show your result and conclusion to the examiner. **14**
2. Perform the Physiological experiment **B** assigned to you. Tabulate your Observations and result. Draw graph if necessary. Show your result and Conclusion to the examiner. **10**
3. Prepare Male flower and Female flower through proper technique of hybridization from the given material **D** and **E**, show your preparation to the examiner. **8**
4. Perform _____ horticulture technique **F** assigned to you, and explain your result to the examiner. **8**
5. Comment upon spot **G, H** and **I**. **15**
6. (a) Submission and *viva-voce*. **7**
(b) Journal **3**



Seat No. _____

Hemchandracharya North Gujarat University, Patan

Under CBCS-Semester-Grading pattern

B.Sc. (Semester-VI) Programme Practical Examination, April/May-20

Botany Practical - PC-BOT-323

[Genetics & Plant Ecology, Plant Anatomy, Economic Botany and Plant Tissue Culture & Biotechnology]

[In force from **December 2013**]

Date: / /20

Place:

Time: **5 Hours**]

[Maximum Marks: **70**

Instruction: Students are requested to follow instructions given by the examiners.

1. Showfrom plant material **A**, stains if necessary with appropriate staining. Draw labeled diagram and show your preparation to the examiner. 6
2. Make temporary double stained preparation of Anomalous Secondary Growth from the given material **B**. Draw a labeled diagram and show your preparation to the examiner. 10
3. Solve and conclude the Genetical problems as per given slip. 8
C.....
4. Identify and give scientific name, family and economic importance of specimens **D** and **E**. 12
5. Prepare the nutrition medium required and precautions to be taken for embryo/callus/meristem culture in the laboratory. 8

OR

Determine above/below ground biomass by monolith method **OR** Calculate Leaf Area Index.

6. Comment upon spot **F**, **G**, **H** and **I**. 16
7. (a) Submission and *viva-voce*. 7
(b) Journal 3



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Under CBCS-Semester-Grading pattern

B.Sc. (Semester-VI) Programme

Elective Subjective Course in BOTANY

ES-BOT-301(Pharmacognosy of Herbal Drugs)

Theory teaching hours: 2 Hours/week

Credit: 2.0

Unit-I Pharmacognosy

- Introduction to Pharmacognosy: Definition, history and scope of Phrmacognosy.
- Sources and classification of drugs: Natural sources: Higher plants, Microbes, Marine and Mineral sources. Classification (only outline): Alphabetical, Morphological, Taxonomical, Chemical and Pharmacological.
- Alkaloids: Introduction, properties, classification and Pharmaceutical applications, Role of alkaloids in Plants.
- Pharmacognostical scheme for studying a drug. Systematic Pharmacognostic study of the following plants containing alkaloids (Botanical name, family, chemical composition and uses):
 - Sarpagandha (root),
 - Barmasi (leaf/whole plant) and
 - *Ephedra* (stem).

Unit-II Pharmacological study of herbal drugs

- Need for Phyto-pharmacological evaluation
- Evaluation of anti diabetic agents
- Evaluation of anti microbial agents
- Evaluation of anti diarrheal agents

References

- Shah C S and Qadry J S(2005), *A Text Book Of Pharmacognosy*, B S Shah Prakashan, Amdavad.
- Mohammed Ali(2008), *Text Book Of Pharmacognosy (2nd edition)*, CBS Publishers & Distributors, New Delhi.
- Handa S S and Kapoor V K(2008), *Text Book Of Pharmacognosy (5th edition)*, Vallabh Prakashan, New Delhi.
- Rangari V D(2004), *Pharmacognosy & Phytochemistry*, Career Publications, Nashik.
- Ansari S H(2006), *Essentials of Pharmacognosy*, Birla Publications Pvt. Ltd., Delhi.
- Kokate C K, Purohit A P and Gokhale S B(2008), *Pharmacognosy (42nd edition)*, Nirali Prakashan, Pune.
- Khandelwal K R (2008), *Practical Pharmacognosy – Techniques & Experiments (19th edition)*, Nirali Prakashan, Pune.
- Kokate C K(2005), *Practical Pharmacognosy (4th edition)*, Vallabh Prakashan, New Delhi.



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-V & VI) Programme
Elective Subjective Course in BOTANY
ES-BOT-302 (*Fresh Water Ecology*)

Theory teaching hours: **2 Hours/week**

Credit: **2.0**

Unit-I

- Definitions: Freshwater, Limnology, Lakes, Ponds, Benthos, Bogs, Marshes and Swamps.
- Properties of freshwater: Physio-chemical characteristic, Factors affecting to fresh water ecosystem: abiotic and biotic (Light, Temperature, Vegetation, etc.).
- Types of Freshwater Ecosystem/Classification of Freshwater Habitat - Lentic ecosystems (still water) and lotic ecosystems (flowing water).
- Structure of lake (Freshwater Zonation). Aquatic biodiversity (Freshwater only): Aquatic flora (Algae, fresher plants).

Unit-II

- Aquatic food web and food pyramids, primary productivity. Aquatic ecosystem: goods and services.
- Energy flow in freshwater ecosystem.
- Threats to aquatic ecosystem and remediation: Eutrophication, Acidification, Pollution.
- Global issues and legislation for conservation and management of aquatic systems.

References:

- Brown L. (1971). Ecology of Fresh Water. Heinemann Educational Books Ltd, London.
Gopal, B, and Bhardwaj, N. (1979). Elements of ecology. Vikash Publishing House Pvt Ltd., New Delhi.
Sharma P. D. (7th Edition - Reprint 2003). Ecology and Environment. Rastogi Publications, Meerut.
Eugene P. Odum (1971). Fundamentals of Ecology. Toppan Company, Japan.



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
B.Sc. (Semester-V &VI) Programme
Elective Subjective Course in BOTANY
ES-BOT-303 (Air Pollution)

Theory teaching hours: **2 Hours/week**

Credit: **2.0**

Unit-I

- Define: Pollution (416) and pollutants (417). Various principal environmental pollutants with examples (416, 417). Kinds of pollutants: Non-degradable (418) and Bio-degradable (418).
- Air Pollution: Introduction (418), Air quality (419), sources and pollutants: Industrial Chimany wastes (419), Thermal power station (419) and Automobile (420 -421).
- Carbon Compounds: Carbon dioxide (423), Carbon monoxide (425).
- Sulphur compound: Sulphur dioxide (426), Hydrogen sulphide (428).

Unit-II

- Nitrogen oxides: Nitrogen oxide, Nitric oxide and Nitrogen dioxide (428 -429).
- Fluorocarbons (434) and Hydrocarbons (435). Metals (435) and Photo-chemicals products (436).
- Prevention and control of air pollution (444 -452).
- Green House Effect (423), Global Warming (425), Ozone -depletion (432), and Acid rain (429).

References:

Shrma P. D. (7th Edition - Reprint 2003). Ecology and Environment. Rastogi Publications, Meerut.



MICRO BIOLOGY



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B.SC. MICROBIOLOGY SEM-VI JUNE-2013

MI-601 IMMUNOLOGY

Credit: 03

Hours: 45

UNIT-1. IMMUNITY AND IMMUNE RESPONSE.

1. Types of Immunity: Definition, types of immunity in terms of host defence. Cell mediated and Humoral immunity.
2. Immune response: Definition, types of Immune responses – primary and secondary immune response. Cells and organs of the immune system, molecules of Immune response- Antigen and Antibody.

UNIT-2. ANTIGENS AND ANTIBODIES

1. Antigen, its types, terms: hapten, epitope, isoantigen, heterologous and homologous antigen, Cell-Associated Differentiation Antigens (CD), ABO and Rh antigens, MHC molecules
2. Antibody, its types, related terms, Structure and function, classes of antibodies, specificity, diversity (concept), Monoclonal and polyclonal antibody

UNIT-3. IMMUNOLOGICAL REACTIONS

1. Agglutination, Complement fixation, ELISA, Immunodiffusion, Immunoprecipitation, Immunoelectrophoresis, Immunoprecipitation, Neutralization, Radio Immunoassay, Serotyping, Flow cytometry, Immuno-blot technique

UNIT-4. IMMUNE DISORDERS.

1. Hypersensitivity – types I, II, III & IV
2. Autoimmune diseases – Immunotolerance, Autoantigen
3. Transplantation (Tissue) Rejection, types of grafts, mechanism of rejection, Graft versus Host Disease
4. Immunodeficiencies – Congenital and Acquired

REFERENCES:

1. Prescott *et al.*, Microbiology, 6th edition.
2. Tortora *et al.*, Microbiology, An Introduction, 4th edition.
3. Madigan *et al.*, Brock Biology of Microorganisms, 8th edition.

ADDITIONAL READING:

1. Kubly *et al.*, Immunology, 5th edition.
2. Roitt *et al.*, Immunology, 6th edition.



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MI-602 INDUSTRIAL MICROBIOLOGY

Credit: 03

Hours: 45

Unit-1: ISOLATION, PRESERVATION AND IMPROVEMENT OF INDUSTRIAL MICROORGANISM

1. Scope of industrial microbiology and biotechnology the range of fermentation processes
2. Isolation criteria ,methods, enrichment and screening
3. Preservation : different methods
4. Improvement of industrially important microorganisms
5. Selection of mutants: natural, induced and DNA recombination
6. Improvement by modifying properties other than yield of product

Unit-2: FERMENTER DESIGN AND MEDIA

1. Basic functions of a typical fermenter
2. Design of an ideal S.T.R and various auxiliary parts
3. Aseptic operation and contaminants
4. Achievement and maintenance of aseptic condition
5. Medium formulations for industry
6. Various media ingredients and the criteria for selection
7. Antifoaming agents
8. Medium sterilization – batch continuous
9. Sterilization of fermenter, feeds and liquid waste
10. Sterilization of air

Unit-3 : DOWNSTREAM PROCESSING

1. Introduction
2. Removal of cells and solids: various methods
3. extraction of intracellular products by cell disruption methods
4. Concentration of extracted products :- methods
5. Purification of products :- chromatographic techniques membrane techniques and ultra filtration
6. drying and crystallization
7. quality assurance –bioassay

Unit-4: TYPICAL FERMENTATION PROCESSES

1. Fermentative productions of antibiotics –penicillin
2. Fermentative productions of ethanol




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3. Fermentative productions of enzyme amylase.
4. Fermentative productions of organic acids –citric acid
5. Fermentative productions of vitamin B₁₂
6. Microbial Biomass

References:

1. Mansi, : Fermentative productions of vitamin B₁₂ fermentation microbiology and Biotechnology, Tylor and Francis.
2. Whittaker: Principles of fermentation technology.
3. Crueger and Crueger: Biotechnology,
4. Pepler: Microbial Technology: Fermentation technology
5. Casida: Industrial Microbiology.



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UNIT-1. MEDICALLY IMPORTANT MICROORGANISMS .

1. Bacterial Diseases of Skin and Eyes, Chicken pox and Herpes.
2. Bacterial Diseases of Nervous System, Rabies and Creutzfeldt -Jakob disease.
3. Bacterial Diseases of Cardiovascular and Lymphatic System, Malaria and Dengue fever.
4. Bacterial Diseases of Respiratory System, Influenza and Common cold.
5. Bacterial Diseases of Digestive System, Hepatitis and Amoebic dysentery.
6. Bacterial Diseases of Urinary and Reproductive System, Genital Herpes and Candidiasis.

UNIT-2. HOST PARASITE RELATIONSHIP.

1. Normal flora of skin, oral cavity, Gastrointestinal tract, and other body regions,
2. Entry of pathogen into the host, Colonization and growth.
3. Toxins – Endotoxins and Exotoxins.
4. Nonspecific host defences – general, physical, chemical and biological barriers.

UNIT-3. EPIDEMIOLOGY.

1. Definition, Types of diseases - pandemic, epidemic, endemic and sporadic, epizootics and zoonoses.
2. Morbidity rate, Mortality rate, types of carriers, types of transmission – airborne, contact, vector- borne.
3. Control of Epidemics.
4. Recognition of Epidemic, antigenic shift and drift, Herd Immunity.

UNIT-3. PROPHYLAXIS.

1. Definition – Immunization, vaccine, adjuvant, serum, antiserum, anamnesis, toxoids.
2. Types of vaccines –whole organism vaccines, Inactivated, Purified macromolecules as vaccines, Recombinant vector vaccines, DNA vaccines, Multivalent subunit vaccines.
3. Antimicrobial prophylactic therapies – malaria prophylaxis, prophylactic use of immunoglobulins.

REFERENCES:

1. Microbiology By Tortora



Unit-1: OVERVIEW OF MICROBIAL PROCESSES

1. Microbial processes in food – SCP and YEAST
2. Microbial processes in industry :-bioleaching and MEOR
3. Microbial processes in agriculture ;- bio insecticide and bio-fertilizer

Unit-2: EXPLORATION OF MICROBES FOR OVER PRODUCTION OF METABOLITES

1. Primary metabolites and strain improvement
2. Secondary metabolites and strain improvements
3. Current advances and future prospects

Unit-3: CONTROL PARAMETERS AND SCALE UP

1. Control systems :- manual and automatic , combined method , requirement for control
2. Biosensor
3. Recent trends in fermentation control
4. Scale up of industrial products

Unit-4: BIOPROCESS ECONOMICS

1. Introduction
2. Fermentation economics for isolation , strain improvement and media design
3. Fermentation economics for sterilization , aeration and agitation and effluent treatments



MI-605 Practical

1. Identification of unknown medically important bacteria from mixed population using identification keys : a) *Escherichia coli*, b) *Enterobacter aerogenes*, c) *Proteus vulgaris*, d) *Salmonella* group : *S. typhi*, *S. paratyphi A*, *S. paratyphi B*, e) *Shigella dysenteriae*, f) *Pseudomonas aeruginosa*.
2. Isolation, cultivation, identification and study of antibiotic sensitivity (Antibiogram) of Gram negative bacteria.
3. Determination of human blood groups: ABO and Rh system.
4. Estimation of Haemoglobin by Sahli's acid haematin method.
5. Total count of Erythrocytes.
6. Total count of Leucocytes.
7. Differential count of Leucocytes by Field's method.
8. Urine examination : Physical, chemical, microscopic.
9. Estimation of blood glucose by GOD/POD method.
10. Estimation of blood urea by Di-Acetyl Monoxime method.
11. Study of Agglutination reaction: i) Dreyer's technique, ii) Double dilution technique.
12. Primary screening of (a) Amylase, (b) Antibiotic producers, i) crowded plate method, ii) Wilkin's method, (c) Organic acid producers.
13. Bioassay of Penicillin using *Bacillus subtilis*.
14. Fermentative production of Amylase and determination of Amylase activity.
15. Determination of Oxygen Transfer Rate (OTR) under static, sparing and shaking condition by sodium sulphite method.
16. Sterility testing of Pharmaceutical products.



Subjective Elective

Credit: 02

Haematology & Blood Banking

Hours: 30

Unit-1 : Blood and its Components

- 1 Plasma and serum
- 2 Red blood cells
- 3 White blood cells
- 4 Platelets
- 5

Unit-2 : Blood Transfusion & Transfusion Reactions

1. Collection, Storage and transfusion of blood
2. Blood grouping
3. Minor and Major cross matching
4. Erythroblastosis Foetalis



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Scheme for Semester End Examination

Semester VI Paper : 601 - 604

EX-1	Characterization and Identification of medically important bacteria	Marks 40
	1. <i>Enterobacter</i> genus	
	2. <i>Salmonella</i> genus	
	3. <i>Shigella</i> genus	
	4. <i>Proteus</i> genus	
	5. <i>Pseudomonas</i>	
Ex-2	Bioassay of antibiotics OR Fermentation exercise	Marks 40
Ex-3	Biochemical tests for Blood and/or Urine	Marks 40
Ex-4	Spotting	Marks 20
Ex-5	Viva	Marks 40
Ex-6	Journal and Slides	Marks 20



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ZOOLOGY




I/c. Registrar
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Choice Based Credit System-Semester-Grading System In Under Graduate B.Sc. Programme

The 11th Five Year plan of India proposed various measures for academic reforms in higher education. To meet the challenges of the changing time and make the higher education in Indian Universities compatible with the universities in developed nations, the UGC (11th Plan, March 2009) and later on the Association of Indian Universities (AIU) stressed on the following recommendations:

- ☞ Semester System
- ☞ Choice Based Credit System
- ☞ Curriculum Development
- ☞ Examination Reforms
- ☞ Administrative Reforms

All the above recommendations for reforms have been reviewed in by representatives of various universities in the Gujarat State and considered for implementation with the aim of transforming Higher Education a transformation where students change from being passive recipients of knowledge to becoming active participants of the knowledge imbining process. The education system in the State the changes from a teacher-centric to learner centric mode. It should aim at all -round integral development of students' personality so that they become good citizens of the new world order.

Salient Features of CBCS in UG Programme :

1. zoology subject in the University/Affiliated Colleges shall offer undergraduate programme in faculty of science from the Academic year 2011 -2012
2. A student will have to get enrolled a core course depending upon his/her requirement of a degree in the said discipline of study. A student will have a choice of selecting an Elective as well as Foundation courses from a pool of courses.
3. Each course shall be assigned a specific number of credits.
4. A core course is the course which should compulsorily be studied by a candidate as a core requirement so as to get degree in a said discipline of study.
5. There shall be four core compulsory courses (Theory) each with 3 credits and their practical's each with 1.5 credits. Thus, credit weightage in Semester V and VI of B.Sc Programme for each core course shall be of 4.5 credits. In short, 4.5 credits multiplied by 4 cores compulsory courses equal to total of 18 credits.
6. In addition to the core courses, a student will have to choose Elective as well as foundation courses from a pool of courses.
7. Two courses of Elective, one each from Generic elective and Interdisciplinary/multidisciplinary/Subject centric electives shall have to be offered. The credit weightage for each Elective course shall be of 02 credits. Hence, a total credit weight-age for Elective courses shall be of 4 credits.
8. One Foundation (English Language) course shall have to be offered. The credit weight-age for foundation course shall be of 02 credits.



Each course shall have a unique course code. The core courses, Elective courses and the foundation courses shall be abbreviated respectively as CC, PC, EG, ES and FC.

1. Core Compulsory -CC
2. Practical core -PC
3. Elective Generic -EG
Elective Subject -ES
4. Foundation Compulsory -FC

Each Academic year shall consist of two semesters, each of 15 weeks of teaching equivalent to 90 working days. The odd semester period shall be from July to November and the Even semester period shall be from December to April.

The course with 4 credits shall be of 60 hrs (15 weeks × 4 credits) duration. The course with 3 credits shall be of 45 hrs (15 weeks × 3 credits) duration. The course with 2 credits shall be of 30 hrs (15 weeks × 2 credits) duration.

A general framework for Bachelor of Science (B.Sc.) programme shall be as follows:

Semester wise credits						Total credits of the Programme
I	II	III	IV	V	VI	144
24	24	24	24	24	24	

The semester wise weightage of core, selective and foundation courses shall be as follows:

Academic year	Core compulsory courses	Elective courses	Foundation courses
Semester I & II	65-75%	15-20%	10-15%
Semester III & IV	65-75%	15-20%	10-15%
Semester V & VI	65-75%	15-20%	10-15%

Attendance:

The Attendance Rules as per the norms of Hemchandracharya North Gujarat University.

Medium Instruction:

The Medium of Instruction shall be of Gujarati medium. Students are free to write answers either in Gujarati or in English language.

Language of Question Paper:

Question paper should be drawn in Gujarati language and its English version should be given.

Evaluation Methods:

1. A student shall be evaluated through Comprehensive Continuous Assessment (CCA)/ (Internal Evaluation) as well as the End of Semester examination (External Evaluation). The weight-age of CCA shall be 30%, whereas the weight-age of the Semester end examination shall be 70%. There will be no internal evaluation in practical courses as well as in elective courses.
2. The Semester assessment (CCA)/ (Internal Evaluation) is spread through the duration of the course and is to be done by the Teacher teaching the course. The assessment is to be done by various means including:



- Internal Test-20 marks
- Assignments/Seminar/MCQ exam, etc. - 05 marks
- Attendance -05 marks

The performance of student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade point. Evaluation for each course shall be done by continuous internal assessment as well as semester end exam and will be consolidated at the end of the course.

3. The End of semester examination (External Evaluation) shall have an assessment based upon following perspective with respect to all the courses:
 - Evaluation with respect to Knowledge
 - Evaluation with respect to Understanding
 - Evaluation with respect to Skill
 - Evaluation with respect to Application
 - Higher Order Thinking Skills
4. With respect to the entire above component, there shall be following types of Questions from each unit of the course.
 - MCQs/Fill in the blanks/ Match the pairs, etc.
 - Short answer questions
 - Medium answer questions
 - Long answer questions
 - Examples/Problems, etc
5. The Examination at the end of semester (Theory) will be conducted by the University. A certified journal of the respective core compulsory course shall be produced at the time of practical examination. In practical exam there will be four practicals in each semester each of 50 marks (40 marks for practical+10 marks for Viva & Journal). Number of student in a practical exam will be 15 to 20 and examiners will be 2 and maximum 3 per practical examination.
6. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks for each course shall be 40% or as decided by concern Board of Studies of the subject.
7. Promotion, Re-Admission and Time for Completion of Course, Procedure for Awarding Grades, Provision for Appeal, etc. as decided by the Hemchandracharya North Gujarat University.
8. Students, who opt zoology as core compulsory subject, should visit National Parks, Sanctuaries, reserve forests etc. within the state and/or outside the state. They should suppose to submit tour report at the time of practical examination.

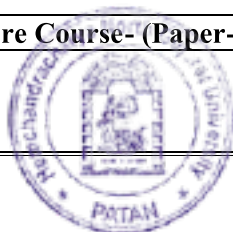


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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc.Programme with 144 credits
CBCS-Semester-Grading Pattern
w.e.f. June-2013

General Pattern/Scheme of study component along with credits for Science faculty.

Particulars	Course	Study component	Instruction Hrs/week	Examination			Credit
				Internal	Uni. Exam.	Total	
B.Sc. Sem.-V	Semester-V						
	Core Compulsory(CC) Course						
	CC-Z 501	Core Course (paper-7)	3	30	70	100	3
	CC-Z 502	Core Course (Paper-8)	3	30	70	100	3
	CC-Z 503	Core Course (Paper-9)	3	30	70	100	3
	CC-Z 504	Core Course (Paper-10)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-Z 501	Practical Core Course (paper-7)	3		50	50	1.5
	PC-Z 502	Practical Core Course (Paper-8)	3		50	50	1.5
	PC-Z 503	Practical Core Course (Paper-9)	3		50	50	1.5
	PC-Z 504	Practical Core Course (Paper-10)	3		50	50	1.5
	Foundation Course (FC)						
	FC-5	Foundation(Generic) Course-V Compulsory English (L.L)	2	30	70	100	2
		Elective Course (E)					
	EG-5	Elective (Generic) Course-V	2		50	50	2
ES-5	Elective (Subject) Course-V	2		50	50	2	
		30	150	650	800	24	
B.Sc. Sem.-VI	Semester-VI						
	Core Compulsory(CC) Course						
	CC-Z 601	Core Course- (paper-11)	3	30	70	100	3
CC-Z	Core Course- (Paper-12)	3	30	70	100	3	



602						
CC-Z 603	Core Course- (Paper-13)	3	30	70	100	3
CC-Z 604	Core Course- (Paper-14)	3	30	70	100	3
	Practical Core (PC) Course					
PC-Z 601	Practical Core Course- (paper-11)	3		50	50	1.5
PC-Z 602	Practical Core Course- (Paper-12)	3		50	50	1.5
PC-Z 603	Practical Core Course- (Paper-13)	3		50	50	1.5
PC-Z 604	Practical Core Course- (Paper-14)	3		50	50	1.5
Foundation Course (FC)						
FC-6	Foundation(Generic) Course-VI Compulsory English (L.L)	2	30	70	100	2
	Elective Course (E)					
EG-6	Elective (Generic) Course-VI	2		50	50	2
ES-6	Elective (Subject) Course-VI	2		50	50	2
		30	150	650	800	24



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester End Examination
Format for Question paper Elective Courses (Subject) in Zoology

There will be three questions. First and Second question will be from each r espective Units and Third will contain questions from both units. The detail format of paper is as under.

Time: 2 hours]

[Total Marks: 50

- | | |
|---|----|
| 1. a. Answer the following (Any one out of two) | 10 |
| b. Attempt any two of following (out of three) | 10 |
| 2. a. Answer the following (Any one out of two) | 10 |
| b. Attempt any two of following (out of three) | 10 |
| 3. Answer the following (Any FIVE out of SEVEN) | 10 |
| (Definition, MCQ, Objective type questions, etc.) | |



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester End Examination
Format for Question paper Core Compulsory Courses in Zoology

There will be five questions. Total marks of the each core compulsory course will be 70. Question No. 1 to 3 carry equal (18) marks and Question No. 4 carry (16) marks. General Format of paper will be as under, provided Examiners are free to use own discretion power to set single question of (18) marks in question number 1 to 3 without giving (a) and (b) option to justify the content of the subject and to check the description ability of students. No change should be made in the format of question number 4.

Time: 3 hours]

[Total marks: 70

- | | |
|---|----|
| 1. a. Answer the following (one out of two) | 10 |
| b. Attempt any one (out of two) | 08 |
| 2 a. Answer the following (one out of two) | 10 |
| b. Attempt any one (out of two) | 08 |
| 3. a. Answer the following (one out of two) | 10 |
| b. Attempt any one (out of two) | 08 |
| 4. a. Answer the following (any six out of ten) | 12 |
| (At least two question from each unit) | |
| b. Attempt the any four (out of seven) | 04 |



- Samples. State your conclusion as environmental point of view .
2. Estimate the amount of _____ from given soil Sample. State your conclusion regarding texture and usefulness. 10
 3. Determine LC 50 of _____ toxicant and state your Conclusion/Suggestions if any. 08
 4. Prepare a graphic representation with help of the given climatic Data. 04
 5. Write as per instruction for the given ecological apparatus, Instruments. 04
 - a. Principle
 - b. Labeled diagram
 - c. Mode of action
 - d. Use
 6. Identify and comment on given chart A & B related to environment and pollution . 04
 7. Journal 05
 - Viva-voce 05

B.SC. SEMESTER-VI
ZOOLOGY
 Course – XI
 CC Z-601
 (BIOCHEMISTRY)

Credit: 3

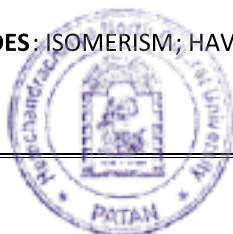
Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]

External evaluation: 70 marks

UNIT-I CARBOHYDRATES

- **MONOSACCHARIDES: ISOMERISM; HAVARTH'S AND FHSER'S FORMULA CLASSIFICATION**

20



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 North Gujarat University
 PATAN

- **OLIGOSACCHARIDES:** MALTOSE; LACTOSE; SUCROSE; CELLOBIOSE; GENERAL STRUCTURE AND THEIR IMPORTANCE
- **POLYSACCHARIDES:**
 1. HOMOPOLYSACCHARIDES: STARCH; GLYCOGEN; CELLULOSE, CHITIN; INULIN
 2. HETEROPOLYSACCHARIDES;
- BIOLOGICAL IMPORTANCE OF CARBOHYDRATES

UNIT-II LIPID

- **FATTY ACIDS:** PHYSICAL AND CHEMICAL PROPERTIES OF FATTY ACID
- **ALCOHOL:** FORMATION OF TRIGLYCERIDES; LIPID FORMATION;
- **CLASSIFICATION:** SIMPLE LIPID; COMPOUND LIPID; DERIVED LIPID
- BIOLOGICAL IMPORTANCE OF LIPID

UNIT-III PROTEINS

- **AMINOACID:** CLASSIFICATION; PHYSICAL AND CHEMICAL PROPERTIES
PEPTIDE AND PROTEIN FORMATION
- **CHEMICAL BONDS:** BONDS OF PROTEIN; SECONDARY BOND OF PROTEIN
- STRUCTURE OF PROTEIN MOLECULE
- CLASSIFICATION OF PROTEINS

REFERENCES

- Biochemistry, S C Rastogi, Tata McGrawHill, New Delhi
- Biochemistry, Satyanarayan
- A Text Book of Biochemistry, A K Berry, Emkay publications, De lhi
- Elements of Biochemistry, H S Shrivastav, Rastogi Publications, Meerat
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**B.SC. SEMESTER-VI
LABORATORY COURSE - XI
ZOOLOGY
CC Z-601
(BIOCHEMISTRY)**

Credit: 1.5

CARBOHYDRATES

- **DETECTION OF MONOSACCHARIDES:** GULCOSE; FRUCTOSE
- **DETECTION OF DISACCHARIDES:** LACTOSE; MALTOSE; SUCROSE
- **DETECTION OF POLYSACCHARIDES:** STARCH; CASEIN

PROTEIN



- DETECTION OF PROTEIN: EGG ALBUMIN; PEPTON

LIPID

- DETECTION OF OIL THROUGH BIOCHEMICAL TEST

ATOMIC MODEL

- PREPARATION OF BALL & STICK ATOMIC MODEL OF FOLLOWING MOLECULES
 - CARBOHYDRATES: GLUCOSE; FRUCTOSE; GALACTOSE; MALTOSE; LACTOSE; SUCROSE
 - AMINO ACIDS
 - LIPID: GLYCEROL

ENZYME ACTIVITY

- DETECTION OF ENZYME ACTIVITY ON CARBOHYDRATE(STARCH) AT NORMAL TEMPERATURE/PH
- DETECTION OF ENZYME ACTIVITY ON CARBOHYDRATE(STARCH) AT LOW TEMPERATURE/ACIDIC P^H
- DETECTION OF ENZYME ACTIVITY ON CARBOHYDRATE(STARCH) AT HIGH TEMPERATURE/BASIC P^H
- TO STUDY MECHANISM OF ACTION OF ENZYME(LOCK & KEY MECHANISM) THROUGH MODEL/CHART

BONDS AND STRUCTURES

- TO STUDY THE DIFFERENT TYPES OF BONDS OF PROTEIN COMPOUND THROUGH MODEL/CHART.
- TO STUDY THE PRIMARY, SECONDARY AND TERTIARY STRUCTURES OF PROTEINS THROUGH MODEL/CHART.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Practical Examination
B.Sc. Sem. VI
Zoology
PC Z 601
(BIOCHEMISTRY)

Time: 5 HOURS]
Date:

[Total Marks: 50



1. Detect the unknown substance from given sample by performing biochemical tests. Conclude and show it to examiner.	15
2. Perform the experiment that shows enzyme digest the food stuff in the mouth. Conclude and show it to examiner.	10
3. Prepare Ball and stick model of molecule as per instruction given by examiner.	6
4. Do as directed:	9
a. Identify and describe the bond of given molecule.	
b. Identify and explain the structure of given molecule.	
c. Identify and describe. (Lock and key model of an enzyme)	
5. Viva voce	5
6. Journal	5

**B.SC. SEMESTER-VI
ZOOLOGY
Course-XII
CC Z 602
(ECOLOGY AND ANIMAL BEHAVIOR)**

Credit: 3

Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]

External evaluation: 70 marks

UNIT-I COMMUNITY ECOLOGY

- DEFINITION & TERMINOLOGY OF ECOLOGY
- CHARACTERISTICS OF A COMMUNITY
- STRUCTURE OF A COMMUNITY



- COMMUNITY DOMINANT AND STRATIFICATION
- CHARACTERS USED IN COMMUNITY STRUCTURE
- ANALYTICAL CHARACTERS(QUANTITATIVE CHARACTERS)
- ECOLOGICAL NICHE, CONCEPTS OF COMMUNITY

UNIT-II ECOSYSTEM

- DEFINITION
- TYPES OF ECOSYSTEM
- STRUCTURE OF ECOSYSTEM :
TERRESTRIAL: FOREST ECOSYSTEM; GRASSLAND ECOSYSTEM
FRESH WATER: POND ECOSYSTEM
- STRUCTURE OF ECOSYSTEM
- ECOLOGICAL PYRAMIDS
- FOOD CHAIN & FOOD WEB
- PRODUCTIVITY OF ECOSYSTEM
- INTERACTION AMONG ORGANISMS

UNIT-III FUNDAMENTALS OF ETHOLOGY & LEARNING BEHAVIOR

- INTRODUCTION TO ETHOLOGY
- APPROACH TO STUDY ETHOLOGY
- MOTIVATION AND FIXED ACTION PATTERN
- INNATE BEHAVIOR; SIGN STIMULI
- OBSERVATION TECHNIQUE AND SAMPLING IN THE FIELD

LEARNING BEHAVIOR: HABITUATION; CONDITIONAL REFLEX; TRIAL & ERROR LEARNING; LATENT LEARNING; DISCRIMINATION LEARNING; IMPRINTING AND INSIGHT

- PARENTAL CARE IN ANIMALS

REFERENCES

- Ecology and Environment, P D Sharma, Rastogi Publications
- Concept of Ecology, N. Arumugam, Saras Publications
- पारिस्थितिकी
- Animal Behaviour, Reena Mathur, Rastogi Publications, Meerut
- Animal Behaviour, Ranga, Agrobios, Jodhpur
- Animal Behaviour, M P Arora, Himalaya publishing House, Delhi
- An Introduction to Animal Behaviour, Manning & Dawkins, Cambridge uni. press

**B.SC. SEMESTER-VI
LABORATORY COURSE-XII
ZOOLOGY
PC Z 602
(ECOLOGY AND ANIMAL BEHAVIOR)**

CREDIT: 1.5

- TO STUDY ECOLOGICAL PYRAMID OF DIFFERENT ECOSYSTEM THROUGH CHART
- TO STUDY POSITIVE AND NEGATIVE INTERACTIONS AMONG ANIMAL THROUGH SPECIMENS OR DIRECT OBSERVATION OR THROUGH CHART



- TO VISIT DIFFERENT PLACES AND TO PREPARE REPORT REGARDING HABITAT -ADAPTATIONS AND INTERRELATIONSHIP WITH OTHER BIOTIC COMPONENT.
 - TO STUDY INSTRUMENTS FOR DIFFERENT METHODS OF LEARNING BEHAVIOR
 - TO STUDY HABITUATION IN MOSQUITOES LARVA/SNAIL
 - TO STUDY TRIAL AND ERROR METHOD OF LEARNING IN HUMAN THROUGH MAIZE/PLAYING CARDS
 - TO STUDY LEARNING BEHAVIOR IN RAT IN ZIGZAG MAIZE
 - TO STUDY PARENTAL CARE IN INVERTEBRATES THROUGH MUSEUM SPECIMEN OR THROUGH FIELD VISIT
 - TO STUDY PARENTAL CARE IN VERTEBRATES THROUGH MUSEUM SPECIMEN OR THROUGH FIELD VISIT
 - PREPARE AN ETHOGRAM OF ANIMAL/BIRD
-

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Practical Examination
B.Sc. Sem. VI Zoology
PC Z 602
(ECOLOGY AND ANIMAL BEHAVIOR)

Time:
Date:

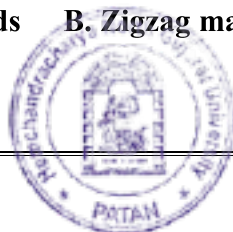
[Total Marks: 50]

1. Perform the experiment to acquire skill by using equipment as per Instruction

10

A. Playing cards B. Zigzag maze

25




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 PATAN

C. Pyramid	D. Arrow and Board	
Prepare a graph of 1. Attempt v/s Errors, 2. Attempt v/s Time , 3. Blind end v/s Errors and Conclude.		
2. Perform the experiment on _____ and record _____ behavior and conclude.		06
A. Mosquito larva –Habituation		
B. Cockroach – Grooming		
3. Find out _____ and _____ by using quatitative analysis method		10
4. Do as directed: Specimens		10
1. Identify and describe its uses.		
2. Identify and explain parental care (Invertebrates)		
3. Identify and explain parental care (Vertebrate)		
4. Identify and describe its Habitat		
5. Identify and comment		
5. Viva-voce		05
Journal		05

B.SC. SEMESTER-VI
ZOOLOGY
Course-XIII
CC Z 603

(EVOLUTION; ZOOGEOGRAPHY AND BIODIVERSITY)

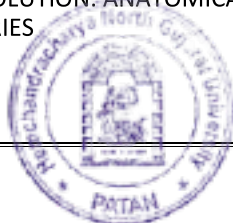
Credit: 3

Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]

External evaluation: 70 marks

UNIT-I EVOLUTION

- DEFINITION
- EVIDENCES OF EVOLUTION: ANATOMICAL & EMBRYOLOGICAL
- MUTATION THEORIES



- ISOLATION & VARIATION
- HARDY-WEINBERG LAW
- **ADAPTATIONS:** AQUATIC; CURSORIAL; ARBOREAL; VOLANT & PARASITIC
- BIOLUMINESCENCE
- LIVING FOSSILS

UNIT-II ZOOGEOGRAPHY

- DEFINITION
- ORIENTAL REGIONS
- PALAEARCTIC REGION
- ETHIOPIAN REGION
- NEARCTIC REGION
- NEOTROPICAL REGION
- AUSTRALIAN REGION

UNIT-III BIODIVERSITY

- DEFINITION & TYPES OF BIODIVERSITY
- VALUE & THREATS TO BIODIVERSITY
- BIODIVERSITY CONSERVATION STRATEGY: IN -SITU AND EX-SITU
- ENDANGERED AND ENDEMIC SPECIES OF INDIA
- NEEDS OF MUSEUM
- PROJECT VULTURE CONSERVATION

REFERENCES

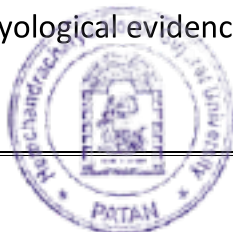
- Genetics and Evolution, S S Khanna, Central Book Depot, Allhabad
- Organic Evolution, N. Arumugam, Saras Publications
- Evolution, Dobzhansky, Surjeet Publications, Delhi
- બાડ, અમદાવાદ
- પ્રાણીજીવન
- બાડ, અમદાવાદ
- Biodiversity (principles and conservation), U Kumar and M. Asizs, Agrobios, Jodhpur
- Global Biodiversity conservation major, Khan & Azmi, Point er Publishers, Jaipur

B.SC. SEMESTER-VI LABORATORY COURSE – XIII ZOOLOGY

**PC Z 603
(EVOLUTION; ZOOGEOGRAPHY AND BIODIVERSITY)**

Credit: 1.5

- To study Homologous organs among animals(anatomical evidences)
- To study analogus organs among animals(anatomical evidences)
- To study embryological evidences in evolution through model



- To study process of evolution through mutation through chart.
- To study various types of adaptations found in different habitat: terrestrial; arboreal; Volant; fossorial; aquatic; cursorial
- To study examples of Hardy-Weinberg law in human population
- To study fauna of different zoogeographical realms
- To study specimens of Living fossils
- To prepare a report on survey of biodiversity of selected local areas
- To prepare a checklist of waterfowl found in nearby water body

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Practical Examination

B.Sc. Sem. VI Zoology

PC Z 603

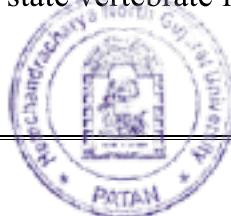
(EVOLUTION; ZOOGEOGRAPHY AND BIODIVERSITY)

Time: 5 HOURS]

[Total Marks: 50

Date:

- | | |
|--|----|
| 1. To solve given problem of Hardy -Weinberg law | 10 |
| 2. Identify and discuss from evolution point of view. (evolutionary evidences) | 05 |
| 3. Compare the adaptations of the given animal and justify their habitat | 06 |
| 4. Do as directed | 15 |
| 1. Identify and describe its characters (realms) | |
| 2. Identify and state vertebrate fauna found in it. | |



3. Identify and describe its adaptations	
4. Identify and describe its present status	
5. Identify and describe	
5. Viva-voce	05
6. Journal	04
7. Study tour report	05

**B.SC. SEMESTER-VI
ZOOLOGY
Course-XIV
CC Z 604**

(TOOLS & TECHNIQUES; IMMUNOLOGY & RADIATION BIOLOGY ; BIostatistic)

Credit: 3

Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]

External evaluation: 70 marks

UNIT- I TOOLS AND TECHNIQUES

- **CHROMATOGRAPHY**: PRINCIPLE, TYPES OF CHROMATOGRAPHY, USE
- **COLORIMETRY**: PRINCIPLE, TYPES OF SPECTROPHOTOMETRY, USE
- **CENTRIFUGATION**: PRINCIPLE, TYPES OF CENTRIFUGE, TYPES OF ROTOR, USES
- **MICROSCOPY**: PRINCIPLE; TYPES OF MICROSCOPE; STRUCTURE OF COMPOUND AND ELECTRON MICROSCOPE

UNIT-II IMMUNOLOGY AND RADIATION BIOLOGY

IMMUNOLOGY:

- CONCEPT OF IMMUNOLOGY
- TYPES OF IMMUNITY
- TYPES OF IMMUNOGLOBULIN



- ANTIGEN- ANTIBODY REACTION
- HYPERSENSITIVITY

RADIATION BIOLOGY:

- TYPES OF RADIATION
- EFFECT OF RADIATION ON HUMAN HEALTH
- GIEGER MULLER COUNTER

UNIT-III BIOSTATISTIC

- CONCEPT OF VARIATION (DISPERSION)
- MEASURES OF VARIATION
- MERITS AND DEMERITS
- APPLICATIONS OF MEASURES OF VARIATION
RANGE
- QUARTILE DEVIATION
- AVERAGE(MEAN) DEVIATION
- STANDARD DEVIATION

REFERENCES

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- Biochemistry, Satyanarayan
- A Text Book of Biochemistry, A K Berry, Emkay publications, Delhi
- Elements of Biochemistry, H S Shrivastav, Rastogi Publications, Meerat
- Immunology, Dulys Fatimas & N. Arumugam, Saras P ublications
- Biology of Immuneresponse, Pitter Abramoff, Tata McGrawHill Publications
- Basics of Biophysics, M.Denial, Agrobios(India)
- Radiation Biology,
- Elements of Biostatistics, S.Prasad, Rastogi Publications
- Biostatistics, P Ramakrishnana, Saras Publica tions

**B.SC. SEMESTER-VI
LABORATORY COURSE- XIV
ZOOLOGY
PC Z 604**

(TOOLS & TECHNIQUES; IMMUNOLOGY; BIOSTATISTIC; BIOPHYSICS)

Credit: 1.5

- To find out Rf value of unknown amino acid through paper chromatography
- To study principle and working method of Thin Layer Chromatography
- To study structure and principle of centrifuge
- To study structure and principle of spectrophotometer
- To study working principle of Microscope
- To detect own blood group by using antisera (antigen-antibody reaction)
- To solve problems of variation as per theory syllabus
- To solve problems of standard deviation as per theory syllabus



- To study structure of Geiger Muller Counter

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Practical Examination

B.Sc. Sem. VI Zoology

PC Z 604

(TOOLS & TECHNIQUES; IMMUNOLOGY; BIOSTATISTIC; BIOPHYSICS)

Time: [Total Marks: 50

Date:

1. Find out Rf value of given unknown amino acid and show your conclusion to the examiner 12
2. Detect your own blood group through proper method and explain Immunological point view 08
3. a. Solve the given problem based on variation. 04



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- b. Solve the given problem based on Standard deviation. 04
4. Do as directed. 12
1. Identify and explain its principle (Tools)
 2. Identify and describe its uses (Tools, Radiation)
 3. Identify and draw its structure (Ig, Antigen-Antibody reaction)
 4. Identify and describe (Radiation biology)
5. Viva voce 05
6. Journal 05
-



CHEMISTRY



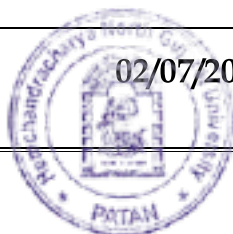
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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Programme code :		Programme Name :	B.Sc.
Faculty :	SCIENCE	Semesters :	V
Subject :	CHEMISTRY		
Effective from :	જૂન-૨૦૧૩ થી		

Sr.	Paper Code	Name of Paper	Credit
1	CC CH- 501	CORE COMPULSORY-INORGANIC CHEMISTRY - I	3
2	CC CH-502	CORE COMPULSORY-ORGANIC CHEMISTRY - II	3
3	CC CH- 503	CORE COMPULSORY-PHYSICAL CHEMISTRY - III	3
4	CC CH- 504	CORE COMPULSORY-STRUCTURAL-ANALYTICAL CHEMISTRY - IV	3
5	SE CH- 505 A	Synthetic Dyes	2
	SE CH- 505 B	Oils, Fats and Waxes	
	SE CH- 505 C	Paints and Varnishes	
	SE CH- 505 D	Cosmetic Chemistry	
	SE CH- 505 E	Metallurgy	
6	GE CH- 506 A	ELECTIVE (GENERIC) COURSE	2
	GE CH- 506 B	ELECTIVE (GENERIC) COURSE	
	GE CH- 506 C	ELECTIVE (GENERIC) COURSE	
7	LC CH-507 A	Laboratory course-I Inorganic Chemistry Practicals	1.5
	LC CH-507 B	Laboratory course-II Organic Chemistry Practicals	1.5
	LC CH-507 C	Laboratory course -III Physical Chemistry Practicals	1.5
	LC CH-507 D	Laboratory course -IV Viva-Voce	1.5

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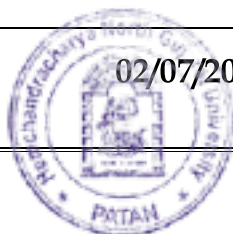

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Programme code :		Programme Name :	B.Sc.
Faculty :	SCIENCE	Semesters :	VI
Subject :	CHEMISTRY		
Effective from :	જૂન-૨૦૧૩ થી		

Sr.	Paper Code	Name of Paper	Credit
1	CC CH- 601	CORE COMPULSORY-INORGANIC CHEMISTRY - I	3
2	CC CH-602	CORE COMPULSORY-ORGANIC CHEMISTRY - II	3
3	CC CH- 603	CORE COMPULSORY-PHYSICAL CHEMISTRY - III	3
4	CC CH- 604	CORE COMPULSORY-STRUCTURAL-ANALYTICAL CHEMISTRY - IV	3
5	SE CH- 605 A	Polymer Chemistry	2
	SE CH- 605 B	Chemistry of Portland Cement	
	SE CH- 605 C	Food Additives	
	SE CH- 605 D	Soaps and Detergents	
	SE CH- 605 E	Forensic Chemistry & Toxicology	
6	GE CH- 606 A	ELECTIVE (GENERIC) COURSE	2
	GE CH- 606 B	ELECTIVE (GENERIC) COURSE	
	GE CH- 606 C	ELECTIVE (GENERIC) COURSE	
7	LC CH-607 A	Laboratory course-I Inorganic Chemistry Practicals	1.5
	LC CH-607 B	Laboratory course-II Organic Chemistry Practicals	1.5
	LC CH-607 C	Laboratory course -III Physical Chemistry Practicals	1.5
	LC CH-607 D	Laboratory course -IV Viva-Voce	1.5

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N. Gujarat. INDIA.

NAAC Accreditation Grade – “B”

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ngu_regi@wilnetonline.net

Website: www.ngu.ac.in

www.ngu_patan.org

FACULTY OF SCIENCE

CHEMISTRY SYLLABUS

(Effective from June-2013)

B.Sc. (semester V & VI Programme)

The proposed new courses in chemistry for under graduate classes are reassigned in accordance to semester/CBCS/Grading system with new education policy. The new course is based on model curriculum of the university grants commission.

The medium of instruction should be Gujarati and the question paper should be drawn in Gujarati with the English version. Students are permitted to write answer in English or Gujarati language.

Its objective are as under:

1. To meet the growing demand of Specialization and Advanced Courses in applied science.
2. To help the colleges to update and modernize their laboratories.
3. To redesign the courses the special emphasis on local requirements, environment, to link the courses with requirements of the industries and research
4. To prepare for National level entrance test like NET/SLET/JRF and other competitive exams.



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FACULTY OF SCIENCE

CHEMISTRY SYLLABUS

(Effective from June-2013)

Common Formula For Question Paper (Core course)

Time: 3 Hours

Total Marks: 70

Theory Examination Pattern(Core Course):

Que. No : 1	A: Write any Two out of Three Questions	14 Marks
	B: Write any One out of Two Questions	06 Marks
Que. No : 2	A: Write any Two out of Three Questions	14 Marks
	B: Write any One out of Two Questions	06 Marks
Que. No : 3	A: Write any Two out of Three Questions	14 Marks
	B: Write any One out of Two Questions	06 Marks
Que. No : 4	Write any Ten out of Twelve Short question / M.C.Q / Short numerical / diagram (Four Questions to be asked from each Unit.)	10 Marks



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FACULTY OF SCIENCE

Chemistry syllabus

Effective from June-2013

This syllabus is to be completed by assigning three periods of one hour each and four practicals of three hours each per week. The number of students in a practical batch should not exceed fifteen.

Pattern of examination:

There will be four paper for core compulsory and one paper for subject elective theory and fourteen hours (two days) for practical in the university examination

The pattern of university exam :

Written	Examination time	Marks External	Marks Internal
Core Course	3 hours (per course)	70	30
Practical Core Course	7 hours (two days)	200	--
Subject elective course	2 hours	50	--



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Hemchandracharya North Gujarat University, Patan

B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Inorganic Chemistry

Paper : CC CH – 601

UNIT :- I : Valency

- Variation method, Secular Equation, Stability of H_2^+ ion; M.O. approach, Stability of H_2 molecule; V. B. approach, Classical interaction energy
- Representation of wave function for SP , SP^2 and SP^3 hybrid orbitals, bond angle and bond strength
- M.O. treatment of OH molecules
- Quantum mechanical representation of Pauli's exclusion principle

UNIT :- II : Metal Carbonyl

- Introduction
- Classification: Mononuclear and Polynuclear
- Physical and Chemical Properties
- Metal Carbonyl (M-CO) bonding (On the basis of V.B.T. and M.O.T.)
- Use of IR Spectra to determination of structure of metal carbonyl
- Structure of Metal Carbonyl
 $Ni(CO)_4, Fe(CO)_5, Cr(CO)_6, Fe_2(CO)_9, Co_2(CO)_8, Mn_2(CO)_{10}, Fe_3(CO)_{12}$
- Calculation of EAN of metal atom in metal carbonyl
- Metal Nitrosyl complexes: - Bonding in metal nitrosyl
- Classification of metal Nitrosyl

UNIT :- III : Bio-Inorganic Chemistry

- Introduction,
- Essential elements,
- Trace elements
- Metal porphyrine,
- Study of hemoglobin and myoglobin
- Nitrogen fixation: In Vivo and In Vitro

Books Suggested (Inorganic Chemistry)

1. Valence and molecular structure by Cartmell and Flower.
2. Text book of Inorganic Chemistry by Durent and Durent.
3. Inorganic Chemistry by S. Chand.
4. Advance Inorganic Chemistry Vol-II Satya Prakash (S.Chand)
5. Concise Inorganic chemistry by J.D.Lee.
6. Metallic Corrosion By M.N. Desai
7. Advance Inorganic Chemistry J.E. Huhee



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B.Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Organic Chemistry

Paper : CC CH - 602

UNIT :- I : Electrophillic and free radical addition reaction

- Addition to carbon carbon double bond
- Markovnikov's rule
- Electrophillic addition, Orientation, Reactivity, Rearrangement, Dimerization, Alkylation
- Peroxide effect (Anti markovnikov's rule)
- Free radical addition, mechanism of peroxide initiated addition of HBr
- Syn and anti addition mechanism for addition of halogens
- Electrophillic addition to conjugated dienes (1: 2 v/s 1: 4 addition)
- Free radical addition to conjugated dienes, reactivity

UNIT :- II : Active Methylene Group Compounds

- Introduction of Tautomerism
- Determination of keto-enol tautomerism
- Differences between Tautomerism and resonance
- Synthesis and application of Ethyl aceto acetate and malonic ester

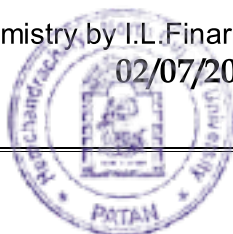
UNIT :- III : Nucleophillic Aromatic Substitutions

- Nucleophilic aromatic substitution [Bimolecular displacement (SN^2) mechanism]
- Elimination – Addition mechanism via benzyne
- Stability and properties of benzyne
- Evidences of Benzyne intermediate

Books Suggested (Organic Chemistry):

1. Organic chemistry by Morrison & Boyd Vth Edition
2. Advance organic chemistry by R.K.Bansal.
3. Organic chemistry by I.L.Finar Vol I & II Vth Edition

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4. Organic chemistry by pine, Hendrikson, Cram and Hammond IVth edition...
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5. Outline of chemical technology by Dryden IInd Edition
6. Synthetic organic chemistry by Gurdeep R Chatwal.
7. Advanced organic chemistry by Jerry March.
8. Organic reactions and their mechanisms IInd edition by P.S. Kalsi.
9. Organic chemistry of natural product Vol: I & II by Gurdeep R. Chatwal.
10. Advanced organic chemistry by Arun Bahal and B.S. Bahal.
11. Organic chemistry Vol, I, II, III by S.M.Mukherjee, S.P.Singh, R.P.Kapoor.

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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Physical Chemistry

Paper : CC CH – 603

UNIT:- I : Thermodynamics

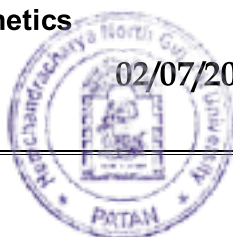
- Zeroth law of thermodynamics
- Absolute temperature scale
- Nernst heat theorem
- Third law of thermodynamics
- Determination of absolute entropy
- Experimental verification of third law
- Entropy change in chemical reactions.
- Concept of Fugacity and determination of Graphical Method
- Numerical

UNIT :- II : Photochemistry

- Introduction
- Difference between Thermal and Photochemical reaction
- The Law of Absorption, Lambert-Beer law
- Laws of Photochemistry,
 - (1) Grothuss-Draper law (2) Stark- Einstein law and it's deviation
- Quantum Efficiency or Quantum Yield
- Experimental determination of Quantum yield
- Reason of high and low Quantum yield
- Types of Photochemical reaction
 - (1) Photosensitized reaction (2) Photochemical equilibrium
- Qualitative description of fluorescence, phosphorescence and chemiluminescence.
- Flash Photolysis
- Numerical

UNIT :- III : Chemical Kinetics

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- Effect of temperature on rate of reaction (Arrhenius equation) જૂન-૨૦૧૩ થી
- Concept of Activation energy
- Theories of reaction rate
 - (1) Collision theory
 - (2) Transition state theory
- Comparison of collision and transition state theory
- Theories of Unimolecular reaction
- Lindemann's theory
- Trimolecular reaction
- Trautz's Law
- Primary salt effect
- Secondary salt effect
- Numerical

Books Suggested (Physical Chemistry) :-

1. Advance Physical Chemistry by Gurdeep Raj.
2. Physical Chemistry (Question and Answer) by R. N. Madan, G.D. Tuli, S.Chand.
3. Principal of Physical Chemistry by Puri, Sharma, Pathania.
4. Chemical Thermodynamics by R.P. Rastogi and R.R.Mishra.
5. Physical chemistry by atkins.
6. Essentials of Physical Chemistry by B. S. Bahal, Arun Bahal, G.D.Tuli,
7. Physical Chemistry by P.W. Atkins, 5th edn, Oxford 1994 7th edn-2002.
8. Physical Chemistry by R.A. Albern and R.J.Silby, John Wiley 1995.
9. Physical Chemistry by G.H. Barrow, 5th edn, Mac Graw Hill, 1988,6th edn, 1996.
10. Physical Chemistry by W.J.Moore, 4th edn, Orient Longmans 1969.



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Structural – Analytical Chemistry

Paper : CC CH - 604

UNIT :- I : Term symbol & spectra of d^1 - d^9 Octahedral complexes

(A)Term Symbol

- L S coupling
- J J coupling
- Determination of ground state term by hund's rules
- Determination of term symbol for all state for p^2 & d^2 configuration by pigeon hole diagram

(B)Spectra of d^1 & d^9 octahedral complexes

- Selection rules & intensities transitions
- Oral diagram for d^1 - d^9 , d^2 - d^8 , d^3 - d^7 , d^4 - d^6 octahedral & tetrahedral complexes explanation of d^1 & d^9 spectra(only introduction-no application)

UNIT :- II : IR spectra & Numericals based on UV, IR and NMR Spectra

(A) Infrared spectroscopy.

- Introduction
- Molecular vibrations (Fundamental vibrations of AX_2 type molecules)
- Characteristics of IR spectroscopy
- Sample techniques
- Fingerprint zone
- Effect of IR in geometrical isomerism
- IR spectra & H-bonding
- Factor affecting on $>C=O$ group frequencies
- Differentiate two compounds by the IR frequencies.

(B) Problems pertaining to the structure elucidation of organic compounds using UV, IR & NMR spectroscopic techniques (one out of two)

UNIT :- III : Chromatography

- Introduction
- Types of chromatography
- Column chromatography
- Paper chromatography
- Thin layer chromatography
- Ion exchange chromatography

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- Van-deemter equation
- examples
- HPLC principle
- Application of chromatography

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Suggested books: (structural chemistry)

1. Chemical application of group theory by F.A.Cotton
2. Chemical bonding and introduction by K.C.Patel, R.D.Patel and Raval
3. Application of group theory to chemistry by Bhattacharya
4. Symmetry in chemistry by Jafle and Orchin
5. Advance inorganic chemistry by cotton & Wilkinson
6. Basic principles of spectroscopy by R.Chand
7. Organic chemistry Vol. 1 by S.M.Mukherji, S.P.Shingh, Kapoor
8. Spectroscopy organic compounds VIth edition by P.S.kalsi
9. Organic chemistry by Morrison and Boyd
10. Spectrometric identification of organic compounds IVth edition by Silverstain, Bassler and Morrill.
11. Application of absorption spectroscopy of organic compounds by John R. Dyer
12. Spectroscopic method in organic chemistry Vth edition by Dudley H. Williams & Ian Fleming
13. Physical methods for chemist Ruwssell S. Drago
14. Organic spectroscopy by Williams & Kemp
15. Organic spectroscopy by V.R.Dani
16. Qualitative Analysis R.A.Day & A.L.Underwood
17. Analytical Chemistry G.D. Christain
18. Fundamentals of Analytical Chemistry D.A.Skoog, D.M. West & F.J.Holler
19. Principales of Analytical Chemistry J.H. Kennedy
20. Analytical Chemistry – Principals & Techniques L.G.Hargis



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Polymer Chemistry

Paper : SE CH – 605 A

UNIT:- I : Polymers – 1

- Introduction
- Classification and Nomenclature of polymers
- Isomerism of polymers
- Chain growth polymerization – Introduction
- Mechanism of free-radical, Cationic and Anionic polymerization
- Kinetics of free radical, Cationic and Anionic polymerization
- Mechanism and Kinetics polycondensation

UNIT:- II : Polymers - 2

- Polymerization Techniques
- Concept of Averages
 - Number average molecular weight
 - Weight average molecular weight
 - Viscosity average molecular weight
- Molecular weight and Degree of polymerization
- Poly dispersity and molecular weight distribution
- Methods for determination of molecular weight
- Membrane Osmometry, Viscometry and Light Scattering

Reference Books:

1. Principles of polymers Science by P.Bahadur and N.V.Sastry.(Second Edition)
2. Polymer Science by V.R.Gowariker, N.V.Vashwanathan and Jaydev Shreedhar.



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Chemistry of Portland Cement

Paper : SE CH – 605 B

UNIT :- I :

- Introduction
- History of Portland Cement
- Types of Portland Cement
- Other Types of Portland Cement
- Indian Standard Institute (ISI) Specification of Cement

UNIT :- II :

- Manufacturing process of Portland Cement
- Reaction in the kiln
- Mixing of Additives to cement
- Setting of Cement
- Growth of Cement Industry in India

References Books :

1. Industrial Chemistry by B.K.Sharma




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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Food Additives

Paper : SE CH – 605 C

UNIT :- I :

- Introduction
- Food Additives and functionalities
- Food additives regulations
 - GRAS
 - The Delaney closes
 - Unintentional
- Assessment of Food Additives

UNIT :- II :

- Classification of Food additives
- Mechanism and chemistry of
 - Flavoring Agents
 - Emulsifiers
 - Acidulants
 - Antioxidants
 - Thickeners
 - Sweeteners
 - Food colours
 - Preservatives
 - Aroma
- Functional classes Food Additives
- List of Authorized Food Additives
- Risk benefit Ratio

Reference Books:

1. Food Chemistry by Alex V. Ramani, MJP Publications, 2009
2. CRC Handbook of Food Additives 2nd Edition, Volume No. II, 2011
3. Tanya Louise Ditschun and Carl K. Winter 2000
4. Food and Safety and authority of Ireland Published by guidance of Food Additives 2010



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Soaps and Detergents

Paper : SE CH – 605 D

UNIT :- I : Soaps

- Soap and its manufacture
- General consideration in soap making
- Manufacture of soap
- Toilet and transparent soap, metal soaps, other soaps
- Oil to be used for soaps
- Cleansing action of soaps
- Recovery of glycerin from spent lye


UNIT :- II : Detergents

- Introduction
- Principal groups of synthetic detergents
- Classification of surface active agents
- Anionic detergents
- Nonionic detergents
- Alkyl sulphates, alkyl aryl sulphonates, alkyl sulphonates, amide sulphonates
- Miscellaneous compounds
- Cationic detergents
- Biodegradability of surfactants
- Detergents containing enzymes
- Eco-friendly detergents
- Zeolites
- Manufacture of shampoos

Reference Books :

1. Industrial Chemistry By B. K. Sharma
2. Dryden's Outlines of Chemical Technology, 3rd Edition , East-West Press




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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Forensic Chemistry & Toxicology

Paper : SE CH – 605 E

UNIT :- I : Introduction of Forensic science, Law, Crime

- Introduction Definition, and Scope of Forensic Science
- History and development, Needs and Principles
- Police and Forensic sciences Laboratory
- Definition, Theories and Prevention of Crime
- Structure of Police, Police & Forensic Scientist
- Relationship with reference to Crime Investigation

UNIT :- II : Forensic Chemistry & Toxicology

- Introduction of Forensic chemistry
- Types of cases received for analysis
- Overview of Forensic chemical analysis
- Forensic analysis of Beverages
 - Alcoholic Beverages (Alcohol, Chloroform)
 - Non-Alcoholic Beverages
- Examination of Chemicals (Phenolphthalein) used in Bribe Trap cases
- Analysis of Adulterated Food
- Introduction of Toxicology
- Classification of Toxicology
- Extraction of Poisons
- Analysis of Poisons

Reference Books:

1. Forensic science in criminal investigation and trials, 4th edition by Dr.B.R.Sharma, Universal law Publishing co. pvt. ltd.



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Laboratory Course

LC CH - 607

(Inorganic, Organic, Physical Chemistry)

Inorganic Chemistry practical

Qualitative analysis (Minimum 10)

Inorganic mixture should be comprised of six radicals.

Candidate if required should be guided once for the wrong group and marks deducted for wrong group. Maximum of five marks can be deducted for wrong group. There shall be no deduction of marks for reporting wrong radicals

Organic Chemistry practical

(A) Estimation of functional groups: (Minimum 03)

- (1) Estimation of Ester
- (2) Estimation of Amide
- (3) Estimation of Ascorbic acid
- (4) Estimation of Aspirin

(B) Synthesis of Organic Compounds (Minimum 05)

- (1) Preparation of m-Dinitro benzene from Nitrobenzene
- (2) Preparation of p-Nitro acetanilide from Acetanilide
- (3) Preparation of Acetanilide from Aniline
- (4) Preparation of Aspirine from Salicylic acid
- (5) Preparation of Di-benzal acetone from Benzaldehyde
- (6) Preparation of 2,4,6-Tribromo aniline from Aniline



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Physical Chemistry

જૂન-૨૦૧૩ થી

[Instruments]: (Minimum 05)

1. To determine concentration of the given Iodide solution by Potentiometric titration against 0.1N KMnO_4 solution.
2. To determine formal redox potential of $\text{Fe}^{+2}/\text{Fe}^{+3}$ by Potentiometry.
3. To determine the concentration of the **nitrite** in the given solution by Colourimetric estimation method.
4. To determine the concentration of unknown solution from given $\text{K}_2\text{Cr}_2\text{O}_7$ by Colourimetry.
5. To determine the Solubility product and solubility of sparingly soluble salt of BaSO_4 by Conductometry.
6. To determine the strength of strong and weak base in a given mixture using a pH meter.

[B] Kinetics, Adsorption & Polymer (Minimum 03)

7. To study the reaction between KBrO_3 and KI at two different temperature and calculate the temperature coefficient and the energy of activation.
8. To study the absorption of Acetic Acid on Charcoal and prove the validity of freundlich equation.
9. To determination of molecular weight of high polymer (i.e. polystyrene) by Viscosity mesasurement.
10. To study the rate constant of the reaction between $\text{K}_2\text{S}_2\text{O}_8$ and KI and study the influence of ionic strength on the rate constant



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B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Pattern of University Practical Exam

Time: 10:30am to 6:00pm (Including 30 minutes recess) Total Marks: 200

First Day

(A) Inorganic (50 marks)

- Inorganic Qualitative Mixture

(B) Organic (50 marks)

- Estimation (25 Marks) & Preparation (25 Marks)

Second Day

(C) Physical (50 marks)

- Any one exercise should be selected for each candidate from syllabus.

(D) Viva-Voce and Journal

• **Viva-Voce on practical base (40 marks)**

- Inorganic13 marks
- Organic13 marks
- Physical14 marks

• **Journal (10 marks)**

- **Note: Without Certified practical record a student will not be permitted to appear at practical examination.**



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Hemchandracharya North Gujarat University, Patan

B. Sc. Chemistry

Semester : VI

જૂન-૨૦૧૩ થી

Suggested batch distribution for practical exam

First Day:

10:30am to 2:00pm	2:30pm to 6:00pm
Inorganic: A	Inorganic: B
Organic: B	Organic: C
Physical: C	Physical: A

Second Day :

10:30am to 2:00pm	2:30pm to 6:00pm
Inorganic: C	Inorganic viva- All students (A,B & C batch)
Organic: A	Organic viva- All students (A,B & C batch)
Physical: B	Physical viva- All students (A,B & C batch)

Batch distribution (for 24 students)

A = 1 to 8
B = 9 to 16
C = 17 to 24

Best wishes



02/07/2013

[Signature]

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BIO- TECHNOLOGY



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**BACHELOR OF SCIENCE (B.SC.)
IN
BIOTECHNOLOGY**



w.e.f. from June 2013

**HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,
PATAN**




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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.Sc. Programme with 144 credits

CBCS-Semester-Grading Pattern

Part/Class	Subject code	Study components	Instructions Hrs / week	Examination			Credit
				Internal	University Exam	Total	
Sem-V B.Sc.		Semester V					
		Core compulsory (CC) Course					
	CC-I-7	Core Course-I (Paper-7)	3	30	70	100	3
	CC-I-8	Core Course-I (Paper-8)	3	30	70	100	3
	CC-II-9	Core Course-II (Paper-9)	3	30	70	100	3
	CC-II-10	Core Course-II (Paper-10)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-I-7,8,9 & 10	Practical Core Course-I (Paper-7,8,9 & 10)	12		200	200	6
		Foundation Course (FC)					
	FC-31	Compulsory English (L.L.)	2	15	35	50	2
		Elective Course (E)					
	EG-31	Elective (Generic) Course	2		50	50	2
	ES-3	Elective (Subject) Course	2		50	50	2
			30	135	615	750	24




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Part/Class	Subject code	Study components	Instructions Hrs / week	Examination			Credit
				Internal	University Exam	Total	
Sem-VI B.Sc.		Semester VI					
		Core compulsory (CC) Course					
	CC-I-11	Core Course-I (Paper-11)	3	30	70	100	3
	CC-I-12	Core Course-I (Paper-12)	3	30	70	100	3
	CC-II-13	Core Course-II (Paper-13)	3	30	70	100	3
	CC-II-14	Core Course-II (Paper-14)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-I-11,12,13 & 14	Practical Core Course-I (Paper-11,12,13 & 14)	12		200	200	6
		Foundation Course (FC)					
	FC-32	Compulsory English (L.L.)	2	15	35	50	2
		Elective Course (E)					
	EG-32	Elective (Generic) Course	2		50	50	2
	ES-32	Elective (Subject) Course	2		50	50	2
			30	135	615	750	24




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B.SC. BIOTECHNOLOGY**SEM 6****CC-I-11****PAPER-11****Fundamentals of Immunology****UNIT-1**

- Innate and Acquired immunity.
- Interrelationship between Innate and Acquired immunity.
- Characteristics of the immune response.
- Cells & Organs involved in the immune response.

UNIT-2

- Antigens : Foreignness, High molecular weight, Chemical complexity, Degradability, Haptens.
- Antigens : Primary and Secondary responses.
- Antigenicity and Antigen binding site, Epitopes recognized by B -cells and T-cells.
- Major classes of antigens, Immunogenic adjuvant.

UNIT-3

- Antibody structure and functions.
- Structural features and biological properties of IgG, IgM, IgA, IgD & IgE.
- Generation of antibody diversity.
- Monoclonal antibody.

UNIT-4

- Antigen-antibody Interactions : Lattice Hypothesis, Agglutination and Precipitation.
- Antigen-antibody interactions : *In vivo* and *In vitro* interactions between Ag & Ab.
- T-Cell generation, activation and differentiation.
- B-Cell generation, activation and differentiation.

REFERENCES


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B.SC. BIOTECHNOLOGY**SEM 6****CC-I-12****PAPER-12****GENETIC ENGINEERING****UNIT-1**

- Mechanisms of gene transfer (Processes gene recombination); Transformation, Transduction and Conjugation.
- Proteins and enzymes involved in r-DNA technologies.
- Cloning vectors : Plasmids, Phages, Cosmids, YACs.
- Application of linker, adaptor and homopolymer tail in joining diverse DNA molecules.

UNIT-2

- Sanger's method for DNA sequencing.
- Automated DNA sequencing.
- Pyrosequencing.
- Microarray based sequencing.
- Chemical and automated DNA Synthesis.

UNIT-3

- Southern blotting, Western blotting, Northern blotting.
- Colony blotting, Dot blotting.
- Hybridization and detection of probe using autoradiography (FISH).
- Cloning strategies: Construction of genomic and cDNA library.
- Screening of Gene in library.

UNIT-4

- Introduction to genome mapping: use of RFLP, SNP and AFLP.
- Chromosome walking.
- Applications of rDNA technology: Gene therapy, Expression of therapeutic proteins, Forensic science.
- Polymerase chain reaction techniques: Basic PCR technique, Variation of PCR techniques and Applications of PCR.

REFERENCES


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- T.A. Brown. Genome.
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B.SC. BIOTECHNOLOGY**SEM 6****CC-I-13****PAPER-13****Environmental Biotechnology****UNIT-1**

- Pollution and contamination of natural components of environment : Define pollution and contamination; sources of pollutants.
- Transport and fate of contamination in the environment.
- Isolation and screening of microbes degrading contamination (pollutants) : selective and enrichment cultivation techniques.
- Biodegradation : Definitions -Ready biodegradability, Ultimate biodegradation, Inferential biodegradability, Recalcitrant compound, Anthropogenic compounds (Xenobiotics).

UNIT-2

- An overview of selected compounds : Petroleum hydrocarbons; Alken es, Cycloalkeanes, Aromatics, Polycyclic, Aromatics & Pesticides.
- Transformation of pesticides - DDT (Dechlorination) to DBP and Biomagnification.
- Reductive dechlorination of PCE & TCE.
- Reductive dechlorination of Petroleum hydrocarbons.

UNIT-3

- Water purification-Dwelling supply and Municipal Supply.
- Microbiological analysis of drinking water.
- Role of indicator organisms, W.H.O. microbiological standards for drinking water.
- Physical, chemical & Biological properties of Wastewater.
- Primary & Secondary treatment, (Biological oxidation processes) & Tertiary treatment process.
- Treatment of solid wastes (Anaerobic digestion and composting).

UNIT-4


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- Bioremediation: types and overview of bioremediation of air, soil and water.
- Biofertilizers.
- Bioplastics.
- Bioleaching and MEOR (Microbially enhanced oil recovery).

REFERENCES

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- Prescott, L.M., Harley, J.P., Klein. DA., (2002) Microbiology (5th Ed Y McGraw Hill. International Ed.
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- Martine Alexander. Biodegradation and Bioremediation.
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B.SC. BIOTECHNOLOGY**SEM 6****CC-I-14****PAPER-14****Analytical Techniques in Biotechnology****UNIT-1**

- Concept of Good Laboratory Practice and Quality Management.
- Analysis: Steps of Analysis.
- Basic Aspects of Qualitative Analysis.
- Basic Aspect of Quantitative Analysis.

UNIT-2

- Mass Spectroscopy, MALDI.
- Light microscopy Differential interference contrast microscopy.
- Electron microscopy: TEM and SEM.
- Atomic force microscopy and Confocal scanning laser microscopy.

UNIT-3

- Introduction to Bioinformatics: History and Overview, Scope of Bioinformatics In Biotechnology, Bioinformatics and Internet.
- Components of Bioinformatics : Biological Databases (DNA Database, Protein Database), overview of Biological sequence analysis - (Pair wise and Multiple Alignment), Biological Software - Rasmol.
- Human Genome Project.
- Overview of Bioinformatics Application: Phylogenetic, Pharmacogenomics (Drug Discovery), Crop Genomics (Agroinformatics), Metabolomics , Chemoinformatics

UNIT-4

- Biosensors : Principles and definition, characteristics of Ideal biosensors.
- Basic measuring procedure, Biochemical components of biosensors.
- Applications of Biosensors.
- Immobilization: Basic concept of immobilization in biotechnology, Principles and mechanism of Immobilization, Methods of Immobilization.
- Bioreactor for Immobilization: Bioreactor and their Types.




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REFERENCES

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- Bioinformatics – Managing Scientific Data, Zoe' Lacroix and Terence Critchlow.
- Bioinformatics – Sequence, Structure and Databanks, Des Higgins & Willie Taylor.




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B.Sc. BIOTECHNOLOGY**Elective Course (EC)(Subjective)****Semester- 6****Paper : DYSFUNCTIONAL IMMUNITY****UNIT-1**

- Primary Immunodeficiency : Severe Combined Immunodeficiency (SCID).
- Secondary Immunodeficiency : AIDS.
- Organ Specific Autoimmune Diseases : Grave's disease and Pernicious anemia.
- Systemic Autoimmune Diseases : Multiple sclerosis and Rheumatoid arthritis.

UNIT-2

- Immediate Hypersensitivity.
- Delayed Hypersensitivity.
- Oncogenes and Cancer Induction.
- Cancer Immunotherapy.




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B.Sc. BIOTECHNOLOGY
Elective Course (EC)(Subjective)
Semester- 6
Paper : DAIRY BIOTECHNOLOGY

UNIT-1

- Nutritional value of Milk.
- Pasteurization of Milk.
- Biochemical Types of Microorganisms in Milk.
- Pathogenic Types of Bacteria in Milk.

UNIT-2

- Starter Cultures used in dairy industry.
- Fermented dairy products.
- Cheese production.
- Types of Cheese.




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B.Sc. BIOTECHNOLOGY
PRACTICAL CORE COURSE
(PAPER-11, 12, 13 & 14)
SEMESTER-6
LIST OF EXPERIMENTS

1. To study water sampling techniques and sample preservation.
2. Determination of Total Solids (TS), Total Dissolved Solids (TDS) and Total Suspended Solids (TSS).
3. Estimation of Dissolved Oxygen (DO) from the given water sample.
4. Estimation of Biological Oxygen Demand (BOD) from the given water sample.
5. Estimation of $\text{PO}_4\text{-P}$ from the given water sample.
6. Estimation of $\text{NO}_3\text{-N}$ from the given water sample.
7. Estimation of $\text{NO}_2\text{-N}$ from the given water sample.
8. Estimation of Chloride from the given water sample.
9. Estimation of Sulfate from the given water sample.
10. Bacteriological analysis of water by Most Probable Number (MPN) technique.
11. Isolation of non-symbiotic nitrogen fixers from soil.
12. Isolation of symbiotic nitrogen fixers.
13. Study of air microflora.
14. Total count of White Blood Cells (WBCs).
15. Total count of Red Blood Cells (RBCs).
16. Differential Count of White Blood Cells (WBCs).
17. Estimation Hemoglobin by Sahli's Method.
18. Blood grouping
19. WIDAL test (Slide Test)
20. Agarose electrophoresis of DNA.
21. Preparation of competent cells and transformation of plasmid DNA.
22. Quantification of DNA by spectrophotometry.
23. Usage of NCBI resources for Biological Information.
24. Immobilization of enzyme.
25. Immobilization of cells.




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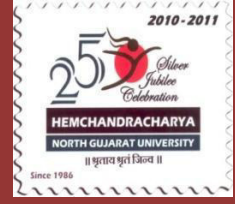
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**HEMCHANDRACHARYA
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PATAN-384 265**



NAAC'B' (CGPA) Accredited (State University)

U.G. (B. Sc.) Programme

CBCS :: Semester :: Grading Pattern

With effect from: June 2013 (In Continuation)

Faculty

Science

Subject

PHYSICS

SYLLABUS

B.Sc. Semesters- V & VI

Total Pages: **1 to 31**

Submitted on

Date:

Chairman

B.O.S. PHYSICS



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Choice Based Credit System-Semester-Grading System In Under Graduate B Sc Programme

The 11th Five Year plan of India proposed various measures for academic reforms in higher education. Keeping in view the challenges of the changed times and make the higher education in Indian Universities compatible with the universities in developed nations, the UGC (11th Plan, March 2009) and later on the Association of Indian Universities (AIU) stressed on the following recommendations:

- ❖ Semester System
- ❖ Choice Based Credit System.
- ❖ Curriculum Development
- ❖ Examination Reforms
- ❖ Administrative Reforms

All the above recommendations for reforms have been reviewed in by representatives of various universities in the Gujarat State and considered for implementation with the aim of transforming Higher Education-**a transformation where students change from being passive recipients of knowledge to becoming active participants of the knowledge imbibing process.** The education system in the State thus changes from a teacher-centric to **learner-centric** mode. It should aim at all-round integral development of students' personality so that they become good citizens of the new world order.

Salient Features of CBCS in UG programme:

1. Physics subject in the Universities/Affiliated Colleges shall offer undergraduate programme in Faculty of Science from the Academic year 2011-12.
2. A student will have to get enrolled a **Core course** depending upon his/her requirement of a degree in the said discipline of study. A student will have a choice of selecting an **Elective** as well as **Foundation** courses from a pool of courses.
3. Each course shall be assigned a specific number of **Credits**.
4. A Core course is the course which should compulsorily be studied by a candidate as a Core requirement so as to get degree in a said discipline of study.
5. There shall be four **Core Compulsory** courses (Theory) each with **3 credits** and their practical's each with **1.5 credits**. Thus, a credit weight-age in Sem-V&VI of **B Sc** programme for each core course shall be of **4.5 credits**. In short, 4.5 credits multiplied by 4 core compulsory courses equal to total of **18 credits**.
6. In addition to the Core courses, a student will have to choose Elective as well as Foundation courses from a pool of courses.



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7. **Two** courses of **Elective**, one each from **Generic Elective** and Interdisciplinary / Multidisciplinary / **Subject centric electives** shall have to be offered. The credit weight-age for each Elective course shall be of **02 Credits**. Hence, a total credit weight-age for Elective courses shall be of **4 credits**.
8. One **Foundation** (English Language) course shall have to be offered. The credit weight-age for Foundation course shall be of **02 credits**.

Each course shall have a unique Course code. The Core courses, Elective courses and the Foundation courses shall be abbreviated respectively as **CC, PC, EG, ES and FC**.

1. Core Compulsory -**CC**
Practical Core -**PC**
2. Elective Generic - **EG**
Elective Subject - **ES**
3. Foundation Compulsory- **FC**

Each Academic year shall consist of **two** semesters, each of **15 weeks** of teaching equivalent to 90 working days. The Odd semester period shall be from **July to November** and the Even semester period shall be from **December to April**.

The course with **4 credits** shall be of **60 hrs** (15 weeks x 4 credits) duration. The course with **3 credits** shall be of **45 hrs** (15 weeks x 3 credits) duration. The course with **2 credits** shall be of **30 hrs** (15 weeks x 2 credits) duration.

A general framework for Bachelor of Science (B Sc) programme shall be as follows:

Semester wise credits						Total credits of the Programme
I	II	III	IV	V	VI	
24	24	24	24	24	24	144

The semester wise weightage of core, elective and foundation courses shall be as follows:

Academic Year	Core compulsory Courses	Elective courses	Foundation courses
Semester I & II	65-75%	15-20%	10-15%
Semester III & IV	65-75%	15-20%	10-15%
Semester V & VI	65-75%	15-20%	10-15%

Attendance:

The Attendance Rules as per the norms of Hemchandracharya North Gujarat University.

Medium of Instruction:

The Medium of Instruction shall be of **Gujarati medium**. Student is free to write answers either in **Gujarati** or **English** language.



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Language of Question paper:

Question paper should be drawn in **Gujarati** language and its **English** version should be given.

Evaluation Methods:

1. A student shall be evaluated through Comprehensive Continuous Assessment (CCA)/ (Internal Evaluation) as well as the End of Semester examination (External Evaluation). The weight-age of CCA shall be 30%, where as the weight-age of the Semester end examination shall be 70%. There will be **no internal evaluation in practical courses** as well as in **elective courses**.
2. The Semester assessment (CCA)/ (Internal Evaluation) is spread through the duration of the course and is to be done by the Teacher teaching the course. The assessment is to be done by various means including:

- ✓ Internal Test - 20Marks
- ✓ Assignments - 05Marks
- ✓ Attendance - 05Marks

The performance of student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points. Evaluation for each course shall be done by continuous internal assessment as well as semester end exam and will be consolidated at the end of the course.

3. The **End of Semester examination (External Evaluation)** shall have an assessment based upon following perspective with respect to all the courses:
 - ✓ Evaluation with respect to Knowledge
 - ✓ Evaluation with respect to Understanding
 - ✓ Evaluation with respect to Skill
 - ✓ Evaluation with respect to Application
 - ✓ Higher Order Thinking Skills
4. With respect to all the above components, there shall be following types of Questions from each unit of the course.
 - ✓ MCQs/Fill in the blanks/ Match the pairs, etc
 - ✓ Short answer questions
 - ✓ Medium answer questions
 - ✓ Long answer questions
 - ✓ Examples/ Problems, etc
5. The End of Semester Examination (Theory) will be conducted by the University. A certified journal of the respective core compulsory course shall be produced at the time of practical examination. In Practical Exam there will be four practicals (each from PC-501 to PC-504 for Sem-V & PC-601 to PC-604 for Sem-VI) each of 50 marks (35-marks for practical+15marks for Viva) and duration of each practical will be 3 hours. Numbers of student in a practical exam will be 16 per batch and examiners will be 2.



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6. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks shall be **40%**, or as decided by concern Board of Studies of the Subject.
7. Promotion, Re-Admission and Time for Completion of Course, Procedure for Awarding Grades, Provision for Appeal, etc. as decided by the Hemchandracharya North Gujarat University.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.Sc. Programme with 144 credits

CBCS-Semester-Grading Pattern

w.e.f. June-2013

General Pattern/Scheme of study components along with credits for Science faculty.

Part/Class	Course	Study Components	Instruction Hrs/ Week	Examination			Credit
				Internal	Uni. Exam	Total	
B. Sc. Sem – V	Semester-V						
	Core Compulsory (CC) Course						
	CC-I- 7	Core Course-I (Paper-7)	3	30	70	100	3
	CC-I- 8	Core Course-I (Paper-8)	3	30	70	100	3
	CC-I- 9	Core Course-I(Paper-9)	3	30	70	100	3
	CC-I-10	Core Course-I(Paper-10)	3	30	70	100	3
	Practical Core (PC) Course						
	PC-I- 7	Practical Core Course-I (Paper-7)	3		50	50	1.5
	PC-I- 8	Practical Core Course-I (Paper-8)	3		50	50	1.5
	PC-I- 9	Practical Core Course-I(Paper-9)	3		50	50	1.5
	PC-I-10	Practical Core Course-I(Paper-10)	3		50	50	1.5
	Foundation Course (FC)						
	FC-5	Foundation (Generic) Course – V Compulsory English (L.L.)	2	30	70	100	2
	Elective Course (E)						
	EG-5	Elective (Generic) Course –V	2		50	50	2
	ES-5	Elective (Subject) Course –V	2		50	50	2
		30	150	650	800	24	




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B. Sc. Sem-VI	Semester-VI						
	Core Compulsory (CC) Course						
	CC-I- 11	Core Course-I (Paper-11)	3	30	70	100	3
	CC-I- 12	Core Course-I (Paper-12)	3	30	70	100	3
	CC-I-13	Core Course-II (Paper-13)	3	30	70	100	3
	CC-I-14	Core Course-II (Paper-14)	3	30	70	100	3
	Practical Core (PC) Course						
	PC-I- 11	Practical Core Course-I (Paper-11)	3		50	50	1.5
	PC-I- 12	Practical Core Course-I (Paper-12)	3		50	50	1.5
	PC-I-13	Practical Core Course-II (Paper-13)	3		50	50	1.5
	PC-I-14	Practical Core Course-II (Paper-14)	3		50	50	1.5
	Foundation Course (FC)						
	FC-6	Foundation (Generic) Course – VI Compulsory English (L.L.)	2	30	70	100	2
	Elective Course (E)						
	EG-6	Elective (Generic) Course –VI	2		50	50	2
	ES-6	Elective (Subject) Course –VI	2		50	50	2
			30	150	650	800	24



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Hemchandracharya North Gujarat University, Patan
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester end Examination (Sem-V & VI)
Format for Question paper Elective Courses (Subject) in Physics

There will be three questions. First question will be from Unit - I, Second question from Unit-II, and Third question will be from both the Units. All the questions are detailed as under.

Time: 2Hrs

Total Marks: 50

- | | |
|---|----------|
| 1 (a) Answer the following (Any two out of three)
(Theory questions) | 08 Marks |
| (b) Attempt any two of following (Out of three)
(Theorytype or Application/Example/Problem) | 06 Marks |
| (c) Attempt any three (Out of five)
(Short answer or objective type questions) | 06 Marks |
| 2 (a) Answer the following (Any two out of three)
(Theory questions) | 08 Marks |
| (b) Attempt any two of following (Out of three)
(Theorytype or Application/Example/Problem) | 06 Marks |
| (c) Attempt any three (Out of five)
(Short answer or objective type questions) | 06 Marks |
| 3 Answer the following (Any ten out of twelve)

(M.C.Q. Type or objective type) | 10 Marks |




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B.Sc. Programme (CBCS-Semester-Grading pattern)

Semester end Examination (Sem-V & VI)

Format for Question paper Core Compulsory Courses in Physics

There will be four questions. First three questions are of 20 marks each and forth question is of 10 marks. First question will be from Unit - I, Second question from Unit-II, Third question from Unit-III, Forth question will be from all three Units. All the questions are detailed as under.

Time: 3Hrs

Total Marks: 70

- | | |
|--|----------|
| 1 (a) Answer the following (Any two out of three)
(Theory questions) | 12 Marks |
| (b) Attempt any four (Out of five)
(Short answer/ objective/ MCQ type questions) | 04 Marks |
| (c) Attempt any one (Out of two)
(Application/Example/Problem) | 04 Marks |
| 2 (a) Answer the following (Any two out of three)
(Theory questions) | 12 Marks |
| (b) Attempt any four (Out of five)
(Short answer/ objective/ MCQ type questions) | 04 Marks |
| (c) Attempt any one (Out of two)
(Application/Example/Problem) | 04 Marks |
| 3 (a) Answer the following (Any two out of three)
(Theory questions) | 12 Marks |
| (b) Attempt any four (Out of five)
(Short answer/ objective/ MCQ type questions) | 04 Marks |
| (c) Attempt any one (Out of two)
(Application/Example/Problem) | 04 Marks |
| 4 Answer the following (Any five out of Eight)
(Short answer or objective type questions) | 10 Marks |



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CBCS - Semester - Grading Pattern

B.Sc. Semester-VI

PHYSICS SYLLABUS

CC: PHY-601

UNIT - I Mathematical Physics

(a) Curvilinear Coordinates

General Curvilinear coordinates (10.8) Vector operators in orthogonal Curvilinear Coordinates (10.9)

Note : The expressions for Divergence and curl are not to be derive but directly expressions are to be given.

Basic Reference: Mathematical Methods in Physical Sciences 2nd Edition by M.L. Boas. John Wiley & Sons.

(a) Special Functions

Legendre differential equation (6.1), Generating Function of Legendre Polynomial (6.2), Rodriguez's formula for Legendre Polynomial (6.3), Orthogonal properties of Legendre Polynomial (6.4), Hermite differential equation and Hermite Polynomial (6.11), Generating function of Hermite Polynomial (6.12), Recurrence formula for Hermite Polynomial (6.13), Rodriguez's formula for Hermite Polynomial (6.14).

Basic Reference: Quantum Mechanics by Satya Prakash, Pragati Prakashan (Reprint-2008)

Other References:

1. Mathematical Physics by B.D.Gupta.
2. Mathematical Physics by H.K.Dass.

UNIT- II CLASSICAL MECHANICS

Variational Principle: Lagrange's and Hemilton's Equations

Configuration space (11.1), Some techniques of caclulus of variat:ion (11.2), Applications of the Variational principle (11.3), Hemilton's principle (11.4). Equivalence of Lagrange's and Newton's equations (11.5), Advantages of the Lagrangion formulation-Electromechanical analogies (11.6), Lagrange's undertermind multipliers (11.7), Lagrange's equation for non-holononiic system (11.8), Application of the Lagrangeian method of undetermined multipliers (11.9), Hemilton's equations of motion (11.10), Some applications of the Hamiltonian formulation (11.11), Phase space (11.12), Comments on the Hamiltonian formulation (11.13).




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Basic Reference: Introduction to classical mechanics by Takawale and Puranic. THM Publication.

Other References:

1. Classical Mechanics, by Goldstein. Narosa Publishing House, New Delhi.
2. Classical Mechanics by Yasvant Waghmare.
3. Classical Mechanics by N.C.Rana and P.S.Joag, THM

UNIT -III QUANTUM MECHANICS

(a) Exactly Soluble Eigen Value Problems : The simple harmonic Oscillator

The schrodinger equation and energy eigen values (4.1), The energy eigen functions (4.2), Properties of Stationary States (4.3), The abstract operator method (4.4), Coherent States (4.5).

(b) Angular Momentum and Parity

The Angular momentum operators (4.6), The eigen value equation for L : Separation of variables (4.7), Admissibility conditions on solutions : eigen values (4.8), The eigen functions : Spherical harmonics (4.9), physical interpretation (4.10), Parity (4.11).

Basic Reference: A text book of Quantum Mechanics by P.M. Methews and K. Venkateshan, THM.

Other References:

1. Quantum Mechanics by Ghatak and Loknathan, The Macmillan company of India Limited.
2. Quantum Mechanics by Fschwabi, Narosa Publishing House, New Delhi.
3. Quantum Mechanics by John, L. Powell and B. Crasemann.
4. Quantum Mechanics by Schiff.




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B.Sc. Semester-VI

PHYSICS SYLLABUS

CC: PHY-602

UNIT- I STATISTICAL MECHANICS

(a) Some Application of Statistical Mechanics

Thermodynamics (6.3), Reversible and Irreversible processes (6.3.1), The Laws of Thermodynamics (6.3.2) ((i) Zeros (ii) First Law (iii) Second Law), Statistical interpretation of the basics thermodynamic variables (6.4, 6.4.1 to 6.4.8), Thermodynamic functions in terms of grand partition function (6.7), Ideal gas (6.8), Gibbs's Paradox (Inclusive Sackur-Tetrode equation) (6.9), The equipartition theorem (6.10).

(b) B.E. and F.D. distribution

Symmetry of wave function(8.1), The quantum distribution functions(8.2), The Boltzman limit of Boson and Fermion gases(8.3), Evaluation of partition function(8.4), Partition function for Diatomic molacules(8.5), Equation of state for an ideal gas(8.6), The quantum mechanical paramagnetic susceptibility(8.7).

Basic Reference: Fundamentals of Statistical Mechanics by B. B. Laud, New AGE Int.Pub.Copyright 1998

Other Reference :

- 1.Statistical Mechanics and Properties of Matter, by E.S.R.Gopal Pub. McMillan Company of India Ltd.
2. Statistical Mechanics by B. K. Agarwal- Melvin Eisner. NewAge Int. Pub.

UNIT-II SOLID STATE PHYSICS

Superconductivity :

Phenomena without observable Quantization(15.1), Zero resistance and persistent currents(15.1.1), Perfect Diamagnetisms : Meissner Effect (15.1.2), London Equation (15.1.3), Critical Field : Type I and Type II super conductors (15.1.4), BCS Theory : A qualitative approach (15.5), Cooper pair formation (15.5.1), BCS ground state (15.5.2), Important predictions of the BCS theory and comparison with experiments (15.6), Critical temperature (15.6.1), Ginzburg-Landau Theory (15.7), Magnetic flux Quantization (15.7.1), Coherence Length (15.7.2), Type-II superconductivity (15.7.3), Josephson tunneling (15.7.4),Applications(15.9).




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Basic Reference: Elements of Solid State Physics by J.P. Srivastava, PHI New Delhi 2003

Other Reference :

1. Solid State Physics by C. Kittel. John Willy and Sons.
2. Solid State Physics by Saxena. Pragati Prakashan.
3. Solid State Physics by C. M. Kachhawa.

UNIT-III Holography and Fiber Optics

(a) Holography

Introduction (23.1), Principle of Holography (23.2, 23.2.1 & 23.1.2), Theory (23.3), Important properties of Hologram (23.4), Advances (23.5-complete), Applications (23.6, 23.6.1-23.6.3).

(b) Fiber Optics

Introduction (24.1), Optical Fibre (24.2), Critical angle of Propagation (24.3), Modes of Propagation (24.4), Acceptance angle (24.5), Fraction of refractive index (24.6), Numerical aperture (24.7), Types of optical fibre (24.8-24.8.1 to 24.8.3), Normalized frequency (24.9), Pulse dispersion (24.10-24.10.1 to 24.10.3), Attenuation (24.11-24.11.1), Applications (24.12-24.12.1 to 24.12.5), Fibre optic Communication system (24.13), Advantages (24.14).

Basic Reference: A textbook of Optics by Dr.N.Subrahmanyam, Brijlal and Dr.M.N. Avadhanulu, S. Chand & Co.



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B.Sc. Semester-VI

PHYSICS SYLLABUS

CC: PHY-603

UNIT- I ELECTROMAGNETICS

Boundary Value Problems in Electrostatic Fields :Special Techniques

Laplace's Equation (3.1), Introduction (3.1.1), Laplace's Equation in two dimensions (3.1.3), Laplace's Equation in three dimensions (3.1.4), Boundary conditions and Uniqueness theorems (3.1.5), The method of images (3.2), The classic image problem (3.2.1), Induced surface charge (3.2.2), Force and energy (3.2.3), other image problems (3.2.4) Separation of variables (3.3), Cartesian Coordinates (3.3.1), Spherical coordinates (3.3.2), Multipole Expansion (3.4), Approximate Potential at large distances (3.4.1), The monopole and dipole terms (3.4.2), Origin of Coordinates in multipole Expansions (3.4.3).

UNIT - II ELECTROMAGNETICS

(a) Electromagnetic Induction:

Faraday's law (7.2.1), The Induced Electric Field (7.2.2), Maxwell's Equation : Electrodynamics before Maxwell (7.3.1), How Maxwell fixed Ampere's Law (7.3.2), Maxwell's Equations (7.3.3), The Potential Formulation : Scalar and Vector Potentials (10.1.1), Gauge Transformations (10.1.2), Coulomb Gauge and Lorentz Gauge (10.1.3)

(b) Electromagnetic Waves:

Electromagnetic Waves in Vacuum: The Wave equation for E and B (9.2.1), Energy and Momentum in Electromagnetic Waves (9.2.3), Electromagnetic Waves in Matter : Propagation in Linear Media (9.3.1), Electromagnetic Waves in conductors (9.4.1), The frequency dependence of permittivity (9.4.3).

Basic Reference: Introduction to Electrodynamics by David J. Griffiths. 3rd Edition Pearson Education Asia.

Other Reference:

Electromagnetics by B. B. Laud. Willey Eastern Ltd.




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UNIT - III ENERGY TECHNOLOGY

(a) Fundamentals and Applications of Solar Energy

Introduction (3.1), Applications (3.2), Essential subsystems in a Solar energy plant (3.3), Solar energy chains (routes) and their prospects (3.4), Terms and definitions of some basic entities (3.4.a.), Units of solar power and solar energy (3.5). Merits and Limitations of Solar energy conversion and utilization (3.6). Energy from the Sun (3.10), Solar constant (3.11).

(b) Solar energy conversion systems and thermal power plants:

Solar thermal power supply system for space station (4.18), Solar energy from satellite station through microwaves to Earth station (4.19), Solar thermoelectric power (4.20).

Solar photovoltaic systems: V-I characteristics of a solar cell (5.6), Inter connections of solar cell (5.7), Efficiency of solar cell (5.8).

Basic Reference: Energy Technology by S. Rao and Dr. B. B. Parulekar. Khanna Publisher, Delhi. 1st edition 1985.



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PHYSICS SYLLABUS

CC: PHY-604

UNIT – I

(a) Feedback Amplifier

Feedback (11.1), Principle of Feedback Amplifiers (11.2), Advantages of Negative Feedback (11.3), Reasons for Negative Feedback (11.4).

(b) Transistor Oscillators (Sinusoidal):

Tuned Collector Oscillators(14.1), Hatley Oscillator (14.4), Colpitt's Oscillators (Circuit operation and alternative treatment only) (14.5), Phase Shift oscillator (14.6), R-C- Oscillator (14.6.1), Wien Bridge Oscillator (14.6.2), Crystal Oscillator (14.7).

Basic Reference: Hand book of Electronics by Gupta & Kumar 30th Revised Edition, 2002 Pragati Prakashan

UNIT - II

(a) Modulation

Introduction (20.1), Expression for Amplitude modulated voltage (20.2), Wave form Amplitude modulated voltage (20.3), Side band produced in Amplitude modulated wave (20.4), Modulated power output (20.5), Frequency Modulation (20.6), Frequency deviation and carrier swing (20.7), Modulation index (20.8, 20.8.1. to 20.8.3), Expression for frequency modulated wave (20.9), Phase modulation (20.10)

Basic Reference: Electronics and Radio Engineering by M. L. Gupta. 9th Enlarged Edition reprint 2002. Dhanpat Rai Publication Co.

(b) Digital Electronics:

Simplification using Karnaugh Maps (21.10-Complete), Don't Care Conditions (21.12), BCD-to-7 Segment Decoder (21.13), Digital Comparator (21.14), Multiplexer (21.15), Demultiplexer (21.16).

Basic Reference: Hand Book of Electronics by Gupta and Kumar. 30th revised Edition 2002.



UNIT - III Programming in C

(a) Operators and Expressions

Introduction (3.1), Operators: Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special (3.2 to 3.9).

Arithmetic Expressions (3.10), Evolution of Expressions (3.11), Precedence of Arithmetic Operators (3.12), Some Computational Problems (3.13), Type Conversion in Expressions (3.14), Operator Precedence and Associativity (3.15), Mathematical Functions (3.16).

(b) Managing Input and Output Operations

Introduction (4.1), Reading and writing a Character (4.2 & 4.3), Formatted Input and Output (4.4 & 4.5)

(c) Decision making and branching

Introduction (5.1), Decision making with if statement (5.2), simple if statement (5.3), The if---else statement (5.4), Nesting of if---else statement (5.5), The else if ladder (5.6), The switch statement (5.7), The ? : operator (5.8), The Goto statement (6.9).

Basic Reference :

Programming in ANSI C (IIIrd Ed.), TMH Pub. **E Balagurusamy**.(Ch:3,4)



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B.Sc. Semester-VI
PHYSICS SYLLABUS

LABORATORY EXPERIMENTS

PC: PHY-601

1. Young modulus 'y' by Koenig method.
2. Optical Lever
3. Viscosity by Log decrement
4. I-V Characteristic of solar cell and determination of F.F, V.F.&n.
5. G.M. Counter (Comparison of Intensities)

PC: PHY-602

1. To determine air gap 't' between two plates of F.P. Etalon and determination of wavelength ' λ ' of monochromatic light
2. Temperature of Flame
3. Newton's Ring (Determination of Wave length of Light)
4. To determine λ and $d\lambda$ of sodium light using Michelson interferometer
5. Determination of wavelength of light by Lloyd's mirror.

PC: PHY-603

1. Mutual induction 'M' of two coil using B.G.
2. High resistance 'R' using leakage method
3. Maxwell's Bridge
4. Solenoid Inductor
5. Susceptibility of FeCl_3 using Quienk's method

PC: PHY-604

1. A study of transistorized Colpit's oscillator using CRO/Wave meter
2. Negative Feedback Amplifier
3. A study of Half subtractor and Full subtractor
4. To determine frequency of AFO using Wein bridge
5. Use of Computer- Programming in 'c' language.




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List of Elective (Subject) Courses For Vth and VIth Sem.

(in force from June 2011)

Credits-2

1. INSTRUMENTS

2. OPTOELECTRONIC INSTRUMENTS

3. PROGRAMMING IN FORTRAN 90 AND 95

4. REMOTE SENSING AND TRANSDUCERS

DETAIL SYLLABUS

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

CBCS - Semester - Grading Pattern

B. Sc. :: PHYSICS :: SEMESTER-V & VI

ES PHY-07: INSTRUMENTS

UNIT-I

Michelson's Interferometer (15.7):-Principle, Construction, Working, Circular fringes, Localized fringes, White light fringes, Visibility of fringes(15.7.1 to 15.7.7), Applications of Michelson Interferometer (15.8)-Measurement of wavelength, Determination of difference in the wavelengths of two waves, Thickness of a thin transparent sheet, Determination of the refractive index (15.8.1 to 15.8.4)

Babinet Compensator (20.21):-Construction(20.21.1), Production of polarized light (20.21.2), analysis of elliptically polarized light (20.21.3).

UNIT-II

C.R.O.:-CR Tube (3.5), Electrostatic Deflection Sensitivity (3.5.1), Magnetic Deflection Sensitivity (3.5.2), CRT connections (3.5.3), Uses of C.R.O. (3.5.4)

G. M. Counter: Principle, Construction, Working, Dead time, recovery time, True counting rate, Efficiency of counting, Quenching of G M counter, Operation and testing of G.M. counter, Plateau, Applications of GMC, Advantages and limitations of GMC.




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Basic references:

1. A textbook of Optics by Dr.N.Subrahmanyam, Brijlal and Dr.M.N. Avadhanulu, S. Chand & Co. (for M.I, B.C.)
2. Hand Book of Electronics by Gupta and Kumar. 30th revised Edition 2002.(for CRO)
3. Refresher Course in Physics Vol-III, S. Chand & Co. Ltd.(7th edition-2006) (for GMC,Ch-28)



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B. Sc. :: PHYSICS :: SEMESTER-V & VI

ES PHY-08: OPTOELECTRONIC INSTRUMENTS

UNIT-I

Introduction (22.1), Attenuation of light in optical medium (22.2), Thermal Equilibrium (22.3), Interaction of light with matter (22.4 -22.4.1 to 22.4.4), Einstein relations (22.5), Light amplification (22.6-22.6.1 to 22.6.2), Population inversion (22.7), Active medium (22.8), Pumping (22.9), Metastable states (22.10), Principal pumping schemes (22.11-22.11.1 to 22.11.4), optical resonant cavity(22.12-22.12.1 to 22.12.3), Axial modes (22.13-22.13.1), Gain curve and laser operating frequencies (22.14), Transverse modes (22.15), Types of Lasers, Ruby Lasers, Helium-Neon Laser, (22.16), Applications (22.20).

Basic Reference: A textbook of Optics by Dr.N.Subrahmanyam, Brijlal and Dr.M.N. Avadhanulu, S. Chand & Co.

UNIT-II

Fabry- Parot Interferometer and Etalon (15.12), Formation of fringes, Determination of wavelength, Measurement of difference in wavelength (15.12.1 to 15.12.3)

Electron Microscope: Principle, electrostatic focusing, magnetic focusing, description, use of electron microscope. (page 204 to 213)

Basic references:

1. A textbook of Optics by Dr.N.Subrahmanyam, Brijlal and Dr.M.N. Avadhanulu, S. Chand & Co. (for F P)
2. Atomic Physics by J.B. Rajam, S.Chand&Co.(1960)(for Ele. Microscope)




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CBCS - Semester - Grading Pattern
B. Sc. :: PHYSICS :: SEMESTER-V & VI

ES PHY-09: PROGRAMMING IN FORTRAN 90 AND 95

UNIT-I

Introduction , Evolution of Fortran 90 (1.1), Writing a Program (2.1), Input Statement (2.2), Some Fortran 90 Program Examples (2.3), Constants (3.1), Scalar Variables (3.2), Declaring Variable names (3.3), Implicit Declaration (3.4), Named Constants (3.5).

UNIT-II

Arithmetic Operators and Modes of Expressions (4.1), Integer Expressions (4.2), Real Expressions (4.3), Precedence of Operations in Expressions (4.4), Examples of Arithmetic Expressions (4.5), Assignment Statements (4.6), Defining Variables (4.7), Some Problems due to Rounding of Real Numbers (4.8), Mixed Mode Expressions (4.9), Intrinsic Functions (4.10), Examples of use of Functions (4.11).

Basic Reference: COMPUTER PROGRAMMING IN FORTRAN 90 AND 95 by V. Rajaraman (Sept.-2008) PHI, New Delhi.




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B. Sc. :: PHYSICS :: SEMESTER-V & VI

ES PHY-10: REMOTE SENSING AND TRANSDUCERS

UNIT-I

Remote Sensing

Introduction, Beginning of Remote Sensing in India, History, Electromagnetic energy, Visible and non-visible radiation, Emission of EM radiation, Atmospheric effect, Solar constant Remote Sensing-a developing Science: Atmospheric Window, Human vision and Human Eye, Useful instruments, Micro-resolution, Photo-geometry.

New Technology: Detectors, Optical Sensors, Types of Optical Sensors, Optical mechanical sensor, Scanning radiometer, IR Scanner, Multi-spectra Scanner. TV, Radar and Slar systems, Applications of RS in different fields –Land set satellites, Earth resource satellites.

Basic Reference: 1. Remote Sensing by Suresh Shah (in Gujarati) Uni. Granth Nirman Board, Ahmedabad. 2. Introduction to Optical Remote Sensing by P. S. Phisaroty (ISRO-Banglore).

UNIT-II

Transducers

What is Transducers? , Classification of Transducers, Classification based on electrical principle involved, Resistive Position Transducers, Resistive Pressure Transducer, Linear Variable Differential Transducer, Piezoelectric Transducer, Strain gauze Transducer, Temperature Transducers, Resistance temperature Detector, Thermistor, Thermocouple, Various types of Microphones, Carbon microphones, Ribbon microphones, Loudspeaker, Moving coil microphones.

Basic Reference: Book- Basic Electronics (solidstate) by B. L. Tharaja , Pub. S. Chand & Compny (5th Edition)




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HOME- SCIENCE




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ADVANCE HUMAN NUTRITION

Semester – 6th

CC - 13

FN (601)

Credit – 2 + 2 = 4

Objectives :-

This course will enable to student to –

1. Understand the functions and sources of nutrients.
2. Apply the knowledge in maintenance of good health for the individual and the community.
3. Be familiar with factors affecting availability and requirements.

Unit – 1

- A. Concept and definition of terms nutrition, malnutrition and health, brief history of nutritional science and scope of nutrition.
- B. Minimal nutritional requirements and RDA formulation of RDA and Dietary guidelines reference man and reference women.

Unit – 2

- A. Body composition and changes through the life cycle.
- B. Energy in human nutrition – Energy balance assessment of energy requirements.

Definition and excess.

Unit – 3

- A. Protein – Assessment of protein quality (BV, PER, NPU) Digestion and absorption, features affecting protein bio-availability including antinutritional factors, Requirements, deficiency. Lipids – Digestion and Absorption. Interpretational resynthesis of triglycerides. Types of fatty acids role and nutritional significance CSFA, MUFA, PUFA. W – 31.
- B. Carbohydrates – Digestion and Absorption, Blood glucose and effect of different carbohydrates on blood glucose, glycolic index, Dietary fiber – Classification, Composition, Properties and nutritional significance.




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Unit – 4

- A. Minerals and Trace elements – Physiological role, bio availability and requirements, sources, Deficiency and Excess (Calcium, Phosphorus, Magnesium Iron, Fluoride, Zinc, Selenium, Iodine, Chromium).
- B. Vitamins – Physiological role, bio-availability and requirements, sources, deficiency and excess (fat soluble and water soluble). Water – Functions requirements.

Practicals:

1. Estimating energy requirements using factorial method.
2. Demonstration of BMR apparatus.
3. categorization of foods as rich, moderate and poor sources of energy and nutrients.
4. planning and preparation of dishes rich in energy, protein, fat, fibre, calcium, iron, vitamin A, vitamin C, thiamine, riboflavin, niacin.

Reference:

- Guthrie A.H. (1986): Introductory Nutrition, 6th Ed. The C.V. Mosby Company.
- Robinsan C.H., Lawler M.R. Chenoweth W.L. and Garwick A.E. (1986): Normal and Therapeutic Nutrition. 17th Ed. Mec Millan Publishing co.
- Swaminathan M. (1985): Essentials of Food and Nutrition, Vol. I and II. Ganesh and co. Madras.
- Gopalan C. et. al. (1991): Nutritive value of Indian foods. Indian council of medical research.
- Indian council of Medical Research (1984): Nutrien t Requirements and Recommended Dietary Allowance for Indians, New Delhi.
- FAO / WHO / UNO: Technical Report Series. T24 (1985) Energy and Protein Requirements, Geneva.
- WHO Technical Report series for different Nutrients.




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FOOD COST AND QUALITY CONTROL - II

Semester – 6th

CC - 14

FN (602)

Credit – 2 + 2 = 4

Objectives :-

This course will be enable the students to –

- Be familiar with different analysis related to food cost and quality control.
- Be familiar with quality control, valuation and assurance.
- Be familiar with the testing of various quality parameters.

Unit – 1

A. Management accounting ratio analysis.

Importance, significance of accounting ratios and its limitations, preparation of ratios, simple workouts, profitability ratios GP, NP, OPERATING, - materials consumed, manufacturing expenses, administrative expenses, selling expenses.

B. Performance or activity ratio INVENTORY, TURN OVER, WORKING CAPITALS, TURNOVER, financial position judgment ratio, CURRENT, LIQUIDITY, FIXED ASSETS, CURRENT ASSETS, DEBY EQUITY.

Unit – 2

A. Break even analysis with simple workouts. (Basic workout mention of P/V ration only theory knowledge)

B. Introduction to variance analysis – meaning and uses price and quantity variance.

Unit – 3

A. Introduction to quality control, evaluation and assurance.

B. Responsibilities and organization of the quality control department.

Unit – 4

A. Sample, inspection sampling and interpretation of data.

B. Container evaluation.




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Practical:

1. Evaluation of raw materials and finished products for specific gravity.
- Size, Shape, Symmetry, Style.
2. Texture – Tenderness, crispness, firmness.
3. Rheology – Viscosity, consistency.
4. Recording and Reporting control charts.
5. Production control. (Theory Base).

Reference:

1. Bhar B.K. (1977): Cost Accounting, Academic Publishing, Calcutta.
2. Matz A., Curry O and Frank G.W. (1970) Cost Accounting, Taraporewala Sons and co. pvt. Ltd., Bombay.
3. Prasad N.K.(1979): Principles and Practice of cost Accounting, Book syndicate pvt. Ltd. Calcutta.
4. Kotas R: An approach to food costing. Berrie and Rockliff ltd., London.




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NUTRITIONAL ASSESSMENT AND EDUCATION

Semester – 6th

CC - 15

FN (603)

Credit – 2 + 2 = 4

Objectives :-

This course should be enable the student to -

1. Understand the concept of nutritional status and its relationship to health.
2. Know the aims and objectives for assessing the nutritional status of an individual and the community.
3. Know the methods used for assessment of nutritional status.
4. Know the extent and types of malnutrition prevalent in the country and region.
5. Identify the factors responsible for the malnutrition.

Unit – 1

- A. Nutritional status assessment and importance – Meaning, need, objectives and importance.
- B. Direct nutritional assessment of human groups – clinical signs, nutritional anthropometry, bio chemical tests, biophysical methods.

Unit – 2

- A. Diet surveys, Need and importance concept of consumption unit, intra and inter individual distribution in family.
- B. Adequacy of diet with respect to RDA concept of family food security.


Unit – 3

- A. Rapid Assessment Procedure – Need and importance, technique.
- B. Interpretation of the data for rapid assessment procedure.

Unit – 4

- A. Types of malnutrition present in the country and region factors responsible for malnutrition.
- B. Sociological factors in the etiology and prevention of malnutrition – food – production, availability, cultural influences, socio-economic factors, food consumption, conditioning




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infections, medical & educational services, psycho social, emergency disaster conditions e.g. famine, floods, war.

Practicals:

1. Take various anthropometric measurements for individuals of different ages e.g. head, chest circumference, MUAC, Height, weight, BMI etc.
2. To assess the nutritional status of individuals and the communities.
3. To collect data and food and nutrient intake of different communities by 24 hour recall method, Household food consumption etc.
4. To know the significance and importance of various biochemical parameter.
5. Clinical assessment and signs of nutrient deficiency for PEM, Vitamin A, Anaemia, Rickets, B complex vitamin deficiencies.

Reference:

- Jelliffe D.B. (1966): Assessment of the nutritional status of the community world health organization.
- Sain D.R., Lockwood R., Scrimshaw M.S. (1981); Methods for the evolution of the impact of food and nutrition programmes, United Nations University.
- Ritchie, J.A.S. (1967); Learning Better Nutrition, FAO, Rome.
- Gopalan C.; Nutrition and Health care, Nutrition Foundation of India, special publication series.
- Beghin, I , M., Dujaram. B. (1988); A guide to n nutritional status assessment W.H.O. Geneva.
- Gopaldas, T. and Seshadri.S. (1987); Nutrition Moniforing and Assessment, Oxford University Press.



INTERNSHIP (Food & Nutrition)

Semester – 6th

CC - 16

FN (604)

Credit – 0 + 4 = 4

Objectives :-

This course will enable the student to –

1. Make use of all the knowledge and skills acquired during the entire course to deal with the community.
2. Understand situational analysis of nutrition and health problems of community.
3. Devise ways and means to bring about possible improvements in the quality of life of the community.

Internship will be organized with different organizations to place the students according to their area of interest. The staff in charge has to work out the details of operation and evolution with the officers of the organization concerned.




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WORK AND WORK ENVIRONMENT

Semester – 6th

CC - 13

RM (601)

Credit – 2 + 2 = 4

Objectives :-

1. Gain knowledge about the human cost of work and know the procedure for designing work and work – place to increase efficiency in household work.
2. To gain knowledge regarding managerial process applied to time as resources.
3. Acquire the ability to use motion study techniques to analyze work and work place.

Unit – 1

- (A) Work - Definition, Characteristics repetitive, routine, diversified and scope for creativities.
- (B) Work values – Efficiency, economy of material and human resources, safety, higher productivity, work quality, standards and satisfaction.
- (C) Management process in work – Planning, organizing, directing, controlling and evaluating.

Unit – 2

- (A) Work environment meaning, importance.
- (B) Component of work environment,
 - Worker, Space design, lighting, climate, noise etc.
- (C) Important work centre of home.
 - Kitchen.
 - Cleaning area.
 - Study room.

Unit – 3

- (A) Principle of body mechanics.
 - Measurement of work area horizontal and vertical.
- (B) Energy – Meaning types of fatigue and energy management.
- (C) Work posture – Study about right posture of work, cost of work and methods of work simplification.




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Unit – 4

- (A) Concept of work place environment, Heat/Cold Health problems, heath cramps, heat exhaustion, heat struck and fatigue.
- (B) Noise / lighting.
- (C) Illumination & vibration and atmospheric pollution etc.

Practicles:

1. To study different work of house (area wise).
2. To find cut expenditure of ti me for work and calculate energy cost.
3. To study the right working posture of house wife.
4. To study the maximum and normal working are on vertical and horizontal surface.
5. To study about process chart.
6. To study about path way chart.




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PATAN

FAMILY BUDGET

Semester – 6th

CC - 14

RM (602)

Credit – 2 + 2 = 4

Objectives :-

To enable students to –

1. Understand the internal and external factors affecting decision.
2. Be able to use to make wise use of money.
3. Develop an appreciation of role of successful financial management in satisfaction family living.

Unit – 1 Family as an economic unit.

- Family types.
- Function of family.
- Economic goals of family.

Unit – 2 Different sources of money income, wages, salaries, rent, profit, interests, transfer of payment etc.

- Sources of real income.
- Regular and irregular income.
- Guidelines for money income management.

Unit – 3 Budgeting as guide to financial management.

- Meaning of budget.
- Benefit of advantages of budget.
- Obstacles of budgeting.

Unit – 4 Characteristics of good budget.

- Factors affecting the budget.
- Engel's law of family expenditure.
- Steps of making budget. (by Gross and Cvand all)




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Reference:

- Home management and family finance by Dr Maneesha Shukul & Prof. Veena Gandotra
– Published by Dominant Publishers and Distributors.
- Nickell, P. and Dorsey, V. (1986); Management in family living, 4th Edu Wilay Eastern Ltd. New Delhi. (Unit II-V, VII).




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FRONT OFFICE AND HOUSEKEEPING ADMINISTRATION

Semester – 6th

CC - 15

RM (603)

Credit – 4 + 0 = 4

Objectives :-

To enable the students to –

- 1) Understand the organizational procedures of front office.
- 2) Comprehend the principle of front office operation.

Unit – 1 Front office:

- (A) Duties of front office personal qualities and attributes of front office personal.
- (B) Basic terminology used in the front office.
- (C) Co-ordination and communication between front office and other department.

Unit – 2 Front office organization:

- (A) Lay out of a front office (Plan).
- (B) Planning Equipment and furniture for the front office.
- (C) Organizational structure of the front office.

Unit – 3 Housekeeping administration:

- (A) Introduction and importance of hospitality.
- (B) Organization of Housekeeping department.
- (C) Duties and responsibilities of housekeeping staff.

Unit – 4

- (A) Job description and job specifications.
- (B) Co – ordination of housekeeping department with other department.
- (C) Job procedures, calculation of standard time, types of shift.




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Reference:

- Andrews, S. (1982): Hotel Front Office Training Manual, Tata Mc Graw Hill.
- Maszom's, J.J.(1971): Front Office Operation, Bobbs.
- Lennox, M., Brauson, J. (1985): Hotel, Hostel and Hospital Ho usekeeping, Pitman Publishing.
- Andrews Sudhir, (1985): Hotel Housekeeping Training Manual, Tata Mc Grow – Hill Publishing Co. Ltd., New Delhi.




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INTERNSHIP

Semester – 6th

CC - 16

RM (604)

Credit – 0 + 4 = 4

- This subject deals with different area's of elective subjects of home science.
 - Below given subjects chosen by students according to their interest of area (anyone).
 - Hotel management – Front office management – housekeeping administration.
 - Dairy – Co-operative sector training – Front management and institution – Office management oblique account keeping, Factory of equipments making – quality control – marketing – designing sector.
 - Training under any architect office – interior designing – oblique office management.
 - Training under resource management.
 - Training under art and craft institute.
-
- Internship will be organized with different organizations to place the students according to their area of interest. The shift incharge has to work out the details of operation and evaluation with the officers of the organization concerned.




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CHILD WITH SPECIAL NEEDS

Semester – 6th

CC - 13

HD (601)

Credit – 2 + 2 = 4

Objectives :-

1. To appreciate the special needs of children with different disabilities and disorders.
2. To gain insight in to the causes of disability and disorders in children and in to their prevention and treatment.
3. To be sensitized to the similarities and differences between disabled and nondisabled children.
4. To perceive the importance of the family and the community in the development of the child with special needs.

Unit – 1

(A) Introduction:

Meaning and definition of child with special needs. Historical perspective of exceptional children, Right of disabled Child. Meaning and importance of special education.

(B) Physically Handicapped children. Definition, Causes, Intervention and management.




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PATAN

PRESCHOOL ORGANISATION & MANAGEMENT OF EDUCATION PROGRAMME

Semester – 6th

CC - 14

HD (602)

Credit – 2 + 2 = 4

Objectives :-

- (1) To acquire knowledge about running management.
- (2) To obtain information related to preschool principles and different educational methods.

Unit – 1

(A) History of preschool education.

- Introduction, Meaning, Objectives.
- Importance and activities.
- Public crèches – Meaning and importance.
- Organization of preschool education after and before independence.

(B) Principles of preschool education.

- Methods of preschool education – Kinder Garten, Montesary and Nursary & Balwadi.
- Characteristics, Limitation.

Unit – 2

(A) Curriculum.

- Meaning & importance.
- Essential principles.
- Building principles of curriculum.

(B) Types of curriculum.

- Importance of content in curriculum.
- Directing principles of curriculum.

Unit – 3

(A) Child & education Institute.

- Educational Institute – Meaning common factors.




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- Classification of educational institute.
- Formal and Informational institute.

(B) Society and building of child.

- School and society.
- Family as a educational institute.

Unit – 4

(A) Social education.

- Necessities of education for society.
- Ways of educational methods for society.
- Goals for social education.

(B) Democratic values.

- Meaning and importance.
- Democratic values in integration of nation.

Practicals:

- (1) Types of building for preschool education.
- (2) Curriculum planning for preschool.
- (3) Types of supervision and implementation.
- (4) Methods of training for supervision ideal.
- (5) To prepare project for ideal play group institute.




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FAMILY DYNAMICS

Semester – 6th

CC - 15

HD (603)

Credit – 4 + 0 = 4

Objectives :-

The student will –

1. Acquire knowledge and insights about the dynamics of contemporary marriage and family systems in India.
2. Become acquainted with the concept, goals and areas of adjustment in marital relationship and within the family.
3. Become aware of the changing roles and relationship within the family.
4. Understand the dynamics of families in distress and crisis.
5. Become aware of the interceptive and preventive family welfare measures.

Unit – 1 The family.

- (A) Definition, functions, types (with reference to India.)
- (B) Family life cycle – stages and substages (beginning, expanding, contracting).
- (C) Changing trends in India and factors influencing (Social change, family values and ideologies, family structures.)

Unit – 2 Marriage.

- (A) Marriage as an institution, goals, rituals, function, changes and challenges.
- (B) Mate selection, factors, in mate selection, considerations of exogamy and endogamy, changing trends, arranged and personal choice of mates.
- (C) Preparation for marriage, social emotional issues, financial concerns and exchanges, guidance and counseling.

Unit – 3 International Relationship within the family.

- (A) Individual roles, rights and responsibilities within the family.
- (B) Family interaction and communication: - Importance, types and methods of improvement.
- (C) Areas of adjustment within the family at different stages of family life cycle.




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Unit – 4 Families with problems and Interventions for families.

- (A) Families with marital disharmony and disruption, dimension, casual factors.
- (B) Families in distress, violence and abuse, dowry victimization, violence against women.
- (C) Interventions for families in trouble.

Reference:

- (1) Augustine, J.N. (Ed.) (1982): The family in transition, New Delhi: Vikas Publishing House.
- (2) Coleman, J.C. (1986): Intimate Relationships, Marriage and the family, Chicago: Macmillan Publishing co.
- (3) Lal, A.K. (1990): The urban family: A study of Hindi Social system, New Delhi: Vikas Publications.
- (4) Rao, P. and Rao, V.N. (1982): Marriage, The family and women in India, New Delhi; Vikas Publications.
- (5) Srinivasan, K. and Mukerji, S. (Eds) (1887); Dynamics of population and Family welfare, Bombay; Himalaya Publishing House.




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INTERNSHIP

Semester – 6th

CC - 16

HD (604)

Credit – 0 + 4 = 4

Objectives :-

- The students will be able to identify the needs, plan and execute programs in an organization conducting ECCE programme or primary school or community.
 - Get an opportunity for exposure to the functioning of the specific agency in the field of family and child welfare.
 - To provide first hand experience to students to undertake educational activities with children having special needs.
-
- Placement will be based on student's conveniency & Interacted areas.
 - Placement Agencies (Select any one areas.)
 - Preschools, day care centers, ICDS centers, classes I & II of primary schools, balwadis and crèches.
 - Urban community centers, Family courts, counseling centers, Rescue homes and shelter homes for women, NGOs working for women in rural and tribal areas, SEWA, TWCA, NGOs working for street children, sponsorship agencies.
 - Schools that provide education to children with special needs in their regular programme.
 - Special schools for children with mental retardation, hearing impairment, visual impairment, learning disability, cerebral palsy and orthopedic disability.
 - Aganwadis and bulwadis that have children with special needs.
 - Community – based programmes for families that may be involved in development and welfare, detection and treatment of disabling conditions in children and their education.
 - Child guidance centers that employ special educators or child development specialists for guiding children and their parents to meet their educational needs.




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- Procedure for evaluation:

The evaluation of the students under internship should be done both by the supervisor from the university / college as well as the placement agency.

- Expected outcome:

At the end of the internship students are expected to develop realistic perspectives of the agency in which they were placed, identify strength and weakness in the services and suggest suitable measures for improvements.




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TEXTILES OF INDIA

Semester – 6th

CC - 13

TC (601)

Credit – 4 + 0 = 4

Objectives :-

- To impart knowledge about the textiles of India.
- To impart knowledge about their method of manufacture , material used designs, dyes and motifs used.
- This enable the students to understand the art, which can form the basis for textile design.

Theory:

Unit – 1 Dyed and printed textiles of India.

- Kalmkari.
- Patola, Tie and dye of Gujarat and Rajasthan.
- Andhra Pradesh: Pochampally, Telia rumali.
- Ikats of Orissa.

Unit – 2 Women Textile of India.

- Brocades.
- Kashmir shawls.
- Muslim of Bengal.
- Silk of Karnataka.
- Cotton of Kerala.

Unit – 3 Woven sarees of India.

Unit – 4 Khadi and cottage Industries.

Reference:

- Chattopadhyay, Kamaladevi (1975): Handicrafts of India, New Delhi, Indian council of cultural Relations.
- Dongerkery, S. (1951): The Romance of Indian Embridery, Bombay, Thakor co.




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COMPUTER ADDED CUSTOM DESIGNING

Semester – 6th

CC - 14

TC (602)

Credit – 0 + 4 = 4

Objectives :-

- To make student aware of computer and its operating system.
 - To develop ability of using printer among student.
 - To make students aware of Auto CAD, Word, Paintbrush.
-
- (i) Introduction to computer system, its various parts and their function.
 - (ii) Introduction to operating system.
 - (iii) Understand & use of basic commands of autocad.
 - (iv) To understand & use menu and toolbox of paint brush.

Articles:

1. Preparing following design (use all Acad commands in one another design)
 - 1.1 Natural design.
 - 1.2 Geometric design.
 - 1.3 Dotted design.
 - 1.4 Conventional design.
 - 1.5 Texture design.
2. Preparation of all above design in paint brush software .
3. Preparation of time table by using word software.

Reference:

1. Computer application – (By Atul Prakashan English & Gujarati version).
2. Autocad 200 – Reference manual.
3. Paint brush – Venus Publication.
4. Word – By Atul Prakashan & Microsoft company.




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FASHION MERCHANDISING

Semester – 6th

CC - 15

TC (603)

Credit – 4 + 0 = 4

Objectives :-

- (1) To equip the student with useful information about costumes behaviour and how it relate to marketing of fashion.
- (2) To analyse the buying function and the different of buyer's responsibilities in various types of merchandising organization.
- (3) To gain knowledge about practiced by merchandises of fashion in determining what to buy and which resource to select.

Unit – 1

- (A) Historical importance of retailing and merchandising.
- (B) Types of label and its importance, temporary permanent care labels.
- (C) The distribution channel.

Unit – 2

- (A) Promotional devices advertising its importance personal selling publicity.
- (B) Branding labeling, price appeal, prelims sampling and packaging.
- (C) Market survey.

Unit – 3

- (A) Standards & standardization of textile products.
- (B) Quality standards for textile by product B.I.S. foreign standards.
- (C) Textile labeling act quality control method used by manufa cture.

Unit – 4

- (A) Fashion concept fashion cycle, factors influencing fashion.
- (B) Theory of fashion designing.
- (C) Human proportions and figure construction type -small medium and fashion figure.




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INTERNSHIP

Semester – 6th

CC - 16

TC (604)

Credit – 0 + 4 = 4

- For clothing and textile subject.
- Training under any textile and garment factories with aspect of designing – quality control, production and marketing management.
- Training for embroidery – hand made and machine made.
- Training for boutique management.
- Training for tailoring business.
- Training under any fashion designing institute related to garment.
- Study of retailing and wholesaling business – garment to textile.
- Training under art and craft institute.




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COMMUNITY ORGANISATION & LEADERSHIP - 2

Semester – 6th

CC - 13

Ext (601)

Credit – 2 + 2 = 4

Objectives :-

To enable students to –

1. Appreciate collective action of weaker section of people for their own development.
2. Understand the community dynamics and its influence on different sections of the community.
3. Study the ideology of organizing people in development.
4. Understand the pattern of leadership in the community traditional and emerging.
5. Understanding the process of organizing people for their own development.

Unit – 1

- Initiative from within the community.
- Initiative from outside the community.
- Role of the community organizer.
- Phase in community organization.

Unit – 2

- Preparation :- Individual approach to members initial meetings, relating with each other as group members, evolving a focus for themselves.
- Setting down: Specifying areas of work, Preparation of work, support needed, sustaining interest in the group, developing interpersonal relationships.
- Stabilization: Shared leadership, developing distinctive identity, a vision of present and future work structure, pattern of work and responsibilities stabilized.

Unit – 3

- Steps in group formation / community organization.
- Experience sharing in meetings.
- Identifying commonalities on experiences.
- Spreading the message of the meetings.




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Unit – 4

- Discussing difficulties in attending meetings and working out solutions.
- Structuring objectives time, place, frequency of meetings and sharing of responsibilities.
- Monitoring the formation of the group. Indicators for monitoring and using them e.g. constancy of membership, common understanding of the objectives, shared participation in meetings, nonsense in decision making etc.

Practicals:

Practicals based on content of theory of community organization and leadership.

Reference:

- Tosslet, D.R. (1976); Facilitating community change: A basic guide, California University Associates.
- Oakley pater and Niassdn Daving (1984); Approach to participation in rural development, Genery.
- Devith, P. Tonsion, Planning and the poor, London.
- Rahman, Md. A (1981) some dimensions of peoples participation in Boomi Sena Movement, UNRISD, Geneva.




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MEDIA FOR DEVELOPMENT PROJECTS

Semester – 6th

CC - 14

Ext (602)

Credit – 0 + 4 = 4

Objectives :-

To enable students to –

1. Explore the use of different media in development projects and
2. Acquire skills in developing and using media in development projects.

Practicals:

- 1) Analysing the use of different media at different stages of planning, implementation and evaluation of project.
- 2) Designing communication strategies as part of the project.
- 3) Evaluating the outcomes in term of knowledge gained, attitude developed and practices improved by the target group.

Reference:

- Roy, G.L> (1991): Extension communication and management, Calcutta, Naya Prakash.
- Jain, R. (1993); Mass Media and Rural Development, Vol. 11, New Delhi, Manak Publications pvt. Ltd.
- Thakur, B.S. and Agrawal (1989); Media utilization for the development of women and children, New Delhi, Concept Publishing co.
- Mody Bella (1991); Designing Messages for Development Communication, New Delhi, Sage Publications.
- Dhama, O.P. and Bhatnagar, O.P. (1988). Education and Communication for Development, New Delhi, Oxford and IBH Publishing co. pvt. Ltd.

Journals:

Journal of Educational Research and Extension, Sri Ramakrishna Mission Vidyalaya College of Education, Coimbatore, Tamil Nadu, India.




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CHANGING TREND IN EXTENSION EDUCATION

Semester – 6th

CC - 15

Ext (603)

Credit – 4 + 0 = 4

Objectives :-

To enable students to:

- (1) Understand the widening concept of extension.
- (2) Be aware of the extension models in practice and their scope in facilitating development.
- (3) Feel strongly for the people without power and influence them to become partners in development projects and programs.

Theory:

Unit – 1 Concept of extension.

- (1) Meaning of Extension.
- (2) Origin and wider understanding of the meaning of extension.

Unit – 2 Extension models:

- (1) Technology – innovation – Transfer model.
- (2) Social Education model.
- (3) Empowerment / Participation model.

Unit – 3 Extension Edu. Process:

- Environment for learning.
- Role of the educator.
- Role of people (Participants) Passive.

Unit – 4 Communication process or Closed communication.

- Learning experiences impred.
- Information oriented to experiential meaning a high level of emotional response.




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Reference:

- Rogers, Alan (1989): Teaching Adults in Extension, Education for Development. Westwood Row, Tilehurst READING RG 316 LT. England, Wood mark.
- Reddy, A. (1987): Extension Education, Bapatia, India, Shree Lakshmi Press.
- WHO (1988): Education for Health, Geneva, Switzerland, World Health Organisation.
- Oakley, Peter and David, Marsden (1984): Approaches to Participation in Rural Development. Published on behalf of the ACC Task Force on Rural Devt., Geneva, International Labour Office.

Journals:

- Changing villages, PPS Gussain for consortium on Rural Technology, D-320, Laxmi Nagar, New Delhi 110091.
- Journal of Rural Development. The National Institute of Rural Development, Rajendranagar, Hyderabad 500029.
- Social Welfare, Central Social Welfare Board, Samaj Kalyan Bhavan, B -12, Tana Crescent, Institutional Area, South of IIT, New Delhi 110016.




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INTERNSHIP

Semester – 6th

CC - 16

Ext (604)

Credit – 0 + 4 = 4

Objectives :-

To enable students to:

1. Gain skills in applying theory learnt in class room in actual life.
2. Prepare themselves for career opportunities available.

Field Placement.

According to their interests and abilities, the students would be placed in organizational agencies dealing with different media. For instance, students interested to develop their talents in the use of folk media may be placed with theatre. Similarly, students as per their interest may be placed with special skills in the particular field.




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HEALTH EDUCATION

Semester – 6th

ES - 6

HE (605)

Credit – 2 + 0 = 2

Objectives :-

- To aware the students about health educational health services.
- Be familiar with the individual health habits and infection diseases.
- To aware the students about firstaid, physical fitness and latest methods of diagnosis.

Unit – 1 Health Education & Health Services.

- Health concept, Factors affecting personal Hygiene, qualities of good health, main objectives of Health education.
- Types of school Health programmes & Health Services, Facilities for Health Education.

Unit – 2 Individual health habits & Infectious diseases.

- Good Habits, some bad habits, characteristics of Infections diseases, Protective measures, Types of Disinfectants.
- Air-borne diseases, water borne disease, Insect-bore diseases, Infectious diseases, common characteristics of sexual diseases.

Unit – 3 First AID & Nutrition.

- Shock, Drowning, Poisoning, Food – Poisoning, Brain Hemorrhage, Bleeding Massage, Bandages and Splints, First AID Box.
- Balanced Diet, Importance of Food Constituents, Factors for affecting to need of balanced diet.

Unit – 4 Physical Fitness.

- Different aspects on physical fitness, strength, speed, Endurance, Flexibility, Co-ordination.
- Latest Methods of Diagnosis: C.T.Scane, M.R.I, Endoscopy, Plastic Surgery, Telemedicine's.

Reference:

- ડૉ. ગિરીશ આર ભટ્ટ, ડૉ. પ્રદ્યુમી આર ભટ્ટ; 1999 શરીરવિજ્ઞાન આરોગ્યશાસ્ત્ર અને રમતવિજ્ઞાન; ધવલ પ્રકાશન




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ADVERTISING AND LABELING INFORMATION

Semester – 6th

EC - 6

AL (605)

Credit – 2 + 0 = 2

Objectives :-

To enable to structures to –

1. Understand the consumer aids for consumer decisions .
2. Chalyse the advertising and lable information contents and assess its influence on consumers.
3. become aware of the need for adequate cognifine data in advertising and lable information which will help the consumers in decision making.

Unit – 1 Introduction to advertisement.

- Advertising and demand.
- Advertising and profits.
- Advertising and goals.
- Role of advertising in consumer decision.

Unit – 2 Types of Advertising.

- Newspaper, Magazine, Direct Advertising, Radio and Television out door advertising, (Direct Mail etc.)
- Advantages and Disadvantage of each.

Unit – 3 Consumer aids.

- Label information.
- Consumer education.
- Trade marks, Brandnames & patents.

Unit – 4

- Package materials, mode and safety.
- Legislation: Rules laid down for advertising and lakelling, and their relevance to consumers.




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References:

- 1) Hevbert. F. Holge (1978): Theory and problems of advertising.
- 2) Beckman, T.R. Maynard, H. and Davidson, W.R.(1989): Principles of marketing, New York, Ronald Press co.
- 3) Kumar Keval, J. (1987) Mass Communication in India: A comprehensive and critical look at the mass media in India.
- 4) Philips, C.R. and Duncan, D.J. (1965); Marketing Principles and Methods, Richards D., Insin Publishers, Illinois.




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DAIRY SCIENCE & ANIMAL HUSBANDRY

Semester – 6th

EG - 6

DAH (606)

Credit – 2 + 0 = 2

Objectives:

The courses is planned to acquaint the students with.

- (1) Study of nutrients and their nutritional importance in livestock.
- (2) Study of various feed and fodders used in animal feeding.
- (3) Method manufacturing of concentrated and condensed dairy products.
- (4) Fat rich dairy products.

Unit – 1

- Indigenous dairy products.
 - Concentrated and condensed dairy products.
- (A) Khoa : Definition, Composition, Types methods of manufacture, Factors affecting yield, Physico chemical changes during manufacture and storage of khoa, over run. Defects.
- (B) Khoa based sweets: Peda, Barfi, Gulab Jamun, Milk cack, Kalakand, Rabri, Basundi, Khir, Kurchan.

Unit – 2

- Condensed and Evaporated milks:
History, status scope in India, definition composition, method of manufacturing, lactose crystallization, browning, heat stability, gelation, salt, balance and defects.
- Fat rich dairy products:
(A) Cream: Definition composition, Methods of cream separation, types of cream factors affecting cream in skimming efficiency, defects.
(B) Butter: Definition, Composition, Classification, Method of manufacturing, Desi butter, Table butter and white butter.
(C) Fat losses in butter milk, Theories of changing over run defects.




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Unit – 3 Introduction regarding.

- Anatomy of digestive system in ruminants (cattle / buffalo).
- Study of rumen microbiology.

Unit – 4 Study of nutrients and their nutritional importance:

- Water, carbohydrates, proteins, lipids, minerals, vitamins, etc.
- Classification of feeds and fodder.
- Agronomical practices for fodder production.

Reference:

- (1) Outline of Dairy technology by Sukumar De: Oxford university press publication.
- (2) Milk and Dairy products Technologies by Edgar Spreed, Marcel Dekker publication.
- (3) Dairy Technology: Principles of milk properties & processes by P. Walstra, T.J.Geurts, A. Noomen, A Jellema and M.A.J.S. van boekel; Marcel Dekker publication.
- (4) Animal Nutrition & Feeding practices in India, S.K.Ranjhan.
- (5) A text Book of Animal husbandry (8th edi.) G.C. Banerjee.
- (6) Feeds and Feeding; G.B. Morrison.
- (7) A textbook of Animal Nutrition; G.C.Banerjee.




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SERICULTURE, BEE KEEPING AND AQUA CULTURE

Semester – 6th

EG - 6

SBA (606)

Credit – 2 + 0 = 2

Objectives:

This course will enable students to –

- To know basic facts about sericulture, beekeeping and aqua culture.
- To know about importance of subject as a income generating activity.

Unit – 1

- History of Sericulture.

Introduction, History, Silk Road, Silk Production, Scope and Limited of sericulture industry.

Unit – 2

- Bee keeping (Apiculture), Advantages of beekeeping as an income generating activity, production process equipment requirement for beekeeping, Species of honeybees, Establishment of lives, Establishing of bee colony, Management of colonies, Harvesting of honey.

Unit – 3

- Principles of aquaculture.

Definition, history and scope of aquaculture, constraints and recent advances in aquaculture criteria for selection of species.

Unit – 4

- Recent advanced or research and institution working for sericulture, beekeeping and aquaculture.




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DIET THERAPY

Semester – 6th

FE - 6

DT (607)

Credit – 0 + 2 = 2

Objectives :-

This course will enable the student to –

1. Know the normal routine diets served in hospitals and for whom these would be served.
 2. To be able to plan diets for therapeutic purposes.
 3. Understand the role of dietician.
-
1. Standardization of common food preparations for portion size.
 2. Planning and preparation of normal diets.
 3. Planning and preparation of recipes using protein concentrates.
 4. Planning and preparation of recipes using sugar substitutes.
 5. Planning and preparation of low fat and low residue recipes.
 6. Planning and preparation of high fiber recipes.
 7. Planning and preparation of bland diet recipes.
 8. Planning and preparation of diets for the following conditions.
 - Overweight and obesity, Underweight, Fevers, Ulcers, Deadhead, Constipation, Malabsorption syndrome, Viral hepatitis, Liver cirrhosis, Cholecystitis, Nutritional anemias.




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YOGA AND MEDITATION

Semester – 6th

FE - 6

YM (607)

Credit – 0 + 2 = 2

Practical:

1. Pravthana & religious songs.
2. Yogic Sharirik Kriya.
3. Shitilikarn Vyayam.
4. Asana (Different).
5. Pranayam.
6. Different Mudras.
7. Surya Namaskar.
8. શરીરશુદ્ધી ક્રિયાઓ




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Semester -VI

Foundation Compulsory

(Com. English)

Unit 1

Text

Lesson. 2, 7, 8

The Joy of Reading – Selected Prose & Poetry

Poems 14, 15, 16

(Orient Longman)

Unit 2

Grammar

- Transformation
- Correction (Articles, Preposition, Tenses, Concord)
- Synthesis of sentences

Unit 3

Developing a Story

Note: Points should be given

Unit 4

Preparing Speeches

- Introducing Chief guest
- Farewell Speech
- Speech on Annual Function
- Mourning the Death of a V.I.P.
- Vote of Thanks
- Speech on Re-public Day




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ELECTIVE GENERIC



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B. Sc. (Sem-I to VI) Programme

Under CBCS-Semester-Grading pattern

List of Elective (Generic) Courses (W.E.F : June 2012)

Each Course of 2 credits and Number of Contact hours = 2 Per Week

(Approximately 24 Contact Hours in Each Semester)

N.B : There are possibilities of Modification in these Course

SEMESTER I

EG-111	Communication Skills
EG-112	Basics of Mathematics
EG-113	Basics of Biology

SEMESTER II

EG-121	Environmental Science
EG-122	Disaster Management

SEMESTER III

EG-211	Personality Development
EG-212	Value Oriented Education

SEMESTER IV

EG-221	Entrepreneurship Development and Small Scale Business Management
EG-222	Human Rights

SEMESTER V

EG-311	Database Management System
EG-312	Indian Constitution

SEMESTER VI

EG-321	Information Technology
EG-322	Naturopathy



Examination Scheme for Elective (Generic) Course

For Generic Courses Other than Computer Courses

Time: **2 Hours**

Theory Examination

Total Marks: **50**

- | | | |
|--------|--|-----------|
| 1. | MCQs (10 out of 12) (Each of 1 Mark) [At least 6 questions from each Unit] | 10 |
| 2 (A) | Short notes (2 out of 3) (Each of 4 Mark) [only from Unit-I] | 08 |
| 2. (B) | Long Question (2 out of 4) (Each of 3 Mark) [only from Unit-I] | 06 |
| 2. (C) | Short Question (6 out of 9) (Each of 1 Mark) [only from Unit-I] | 06 |
| 3 (A) | Short notes (2 out of 3) (Each of 4 Mark) [only from Unit-II] | 08 |
| 3. (B) | Long Question (2 out of 4) (Each of 3 Mark) [only from Unit-I] | 06 |
| 3. (C) | Short Question (6 out of 9) (Each of 1 Mark) [only from Unit-I] | 06 |

Examination Scheme for Elective (Generic) Course

For Computer Courses : EG-311,EG-321

Time: **1.5 Hours**

Theory Examination

Total Marks: **30**

- | | | |
|--------|--|-----------|
| 1. | MCQs (6 out of 9) (Each of 1 Mark) [At least 4 questions from each Unit] | 06 |
| 2 (A) | Short notes (2 out of 3) (Each of 4 Mark) [only from Unit-I] | 08 |
| 2. (B) | Short notes (4 out of 6) (Each of 1 Mark) [only from Unit-I] | 04 |
| 3 (A) | Short notes (2 out of 3) (Each of 4 Mark) [only from Unit-II] | 08 |
| 3. (B) | Short notes (4 out of 6) (Each of 1 Mark) [only from Unit-II] | 04 |

Practical Examination

Examination Pattern for EG-311,EG-321: (Computer Courses)

Time: **1 Hour]**


[Maximum Marks: **20**

- | | | |
|-------|--|-----------|
| 1. | પ્રેક્ટિકલ (2 પ્રેક્ટિકલ સ્વાધ્યાયમાંથી કોઈ પણ 1)
Practical (1 out of 2 practical exercise) | 15 |
| 2. a. | મૌખિક પ્રશ્નોત્તરી. [viva-voce.] | 03 |
| b. | પ્રયોગપોથી [Journal.] | 02 |

Note: * Student will have to note all the steps/procedure related to the practical carried out by him/her in his/her answer book. Due weightage should be given while evaluating the practical. The purpose of this requirement is to create the skill of documentation among the students.

* These answer book will be submitted with the along with the mark sheet to the university by the examiner.




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SEMESTER V

EG-321 Information Technology

EG-322 Naturopathy

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Programme code :	B.Sc.	Programme Name :	Information Technology	
Course Code	EG 321	Semester :	VI	
Personality Development				
Course type :	Elective Generic	Total credit :	02	
Teaching time (hours)	Examination Marking scheme			
Theory (hrs)	Practical (hrs)	Internal (Marks)	External (Marks)	Total (Marks)
2	-	20	30	50

Information Technology

Unit I

1. introduction to information technology
2. information technology: an overview
3. Basics of Internet : Introduction, History, Internet Management, Definitions of Internet , Growth of Internet,
4. Accessing the Internet and Internet Service Providers (ISPs)

Unit II

1. Internet services : Introduction, World Wide web, How does web work, Web server, Web browsers,
2. Mark-up Languages and Internet Applications
3. Internet Information Resources
4. Search Engines

Reference Books

IGNOU study material for Information technology



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN				
Programme code :	B.Sc.	Programme Name :	Naturopathy	
Course Code	EG - 322	Semester :	VI	
Personality Development				
Course type :	Elective Generic	Total credit :	02	
Teaching time (hours)	Examination Marking scheme			
Theory (hrs)	Practical (hrs)	Internal (Marks)	External (Marks)	Total (Marks)
2	-	-	50	50

Naturopathy

Unit:1

- 1.1 પાકલક +વન – આરોગ્યની કાવલ, પેત્રિવો
- 1.2 તિવ/રોગો – ચરદી, તાવ, ઝાડા,]I 3I,]I ka, ma4દાવવાં ચરિર દાવવાં
- 1.3 +` Rોગો – બ5tra 4વલ, ધાસી, ધ્વા5, so= Aaao Aavvl
- 1.4 +વનનુસંદ્ધર – I ઓનુ} eudba`, camDina rogo,
kol ay3Is, Āēpdr, v2iv

Unit:2

- 2.1 સુપ્તન, પા` ayam, yog
- 2.2 Spā{nl koDRba4, k3I Snan, S3Im ba4
- 2.3 ma3I Snan, Aēma, mail s, msaj
- 2.4 insgoBcarnl sf5ta –kmal , Aamvat, m2pnh, sfē dag, S4Bta dm

સંદર્ભ સાહિત્ય

- É. DaR + tē, AayRpāklk +vnxEI Anērog invar`, nv+vn pKaxn
- É. ga2I+, AarōGynl cavl, nv+vn pKaxn miēdr. Amdavad-ÉĪ
- É. 7I vl.pl. igdva` l: kdrtl]pcarnl kmal : pāyog dXy pKaxn. Amdavad-ÉĒ



ENGLISH



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NAAC Accreditation Grade –“B”



English Compulsory

New Syllabus (CBCS)
(For Semester : I to IV)

ARTS / SCIENCE / FINE ARTS

W.E.F. JUNE-2011

Date:20/6/2011

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