VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER–III Inter Disciplinary Subject (IDS)
(Mathematical Modeling-I)
Effective from June 2012
Marks: 50 (15 internal + 35 external)
(3 hour / Week–Credit: 2)

Unit I:

Mathematical modeling through ordinary differential equation of first order; Linear growth models; Linear decay models; Models for growth of Science & scientists;.

Unit II:

Non-linear growth & decay models; Model of Logistic law of population; Spread of technological innovation; Spread of infectious diseases; Model of rate of dissolution; Model for law of mass action.

Unit III:

Mathematical models of geometrical problems through ordinary differential equation of first order; Simple geometrical problems; Orthogonal trajectories.

The course is covered by the following reference books :

1. J. N. Kapoor : Mathematical Modelling, New Age International Publishers, New Delhi.
2. Kreysig: Advanced Engineering Mathematics, John Wiley, NewYork, 1999.
3. J.K. Sharma : OR Theory & Applications, Mac Milian India Ltd., 1998.
4. G. Hadley : Linear Programming, Narosa Publishing House, New Delhi,1995.
5. G. Paria : Linear Programming, Transportation, Assignment, Game, Books & Allied Pvt. Ltd. Calcutta - 9.

* Use of Scientific non – Programmable calculator is allowed.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER–IV Inter Disciplinary Subject (IDS)
(Mathematical Modeling-II)
Effective from June 2012
Marks: 50 (15 internal + 35 external)
(3 hour / Week–Credit: 2)

Unit I:

Mathematical modeling of effect of immigration & emigration on population size; Mathematical models of rate of compound interest; Mathematical models of radioactive decay.

Unit II:

Mathematical modeling of Newton's cooling law; Mathematical modeling of Fick's law of diffusion; Mathematical modeling of change in price of commodity.

Unit III:

Mathematical models of epidemics to system of ordinary differential equations of first order; Simple epidemic model; SIS model; SIS model with constant number of carriers; Simple epidemic model with carriers; Model with removal; Model with removal & immigration.

The course is covered by the following reference books :

1. J. N. Kapoor : Mathematical Modelling, New Age International Publishers, New Delhi.
2. Kreysig: Advanced Engineering Mathematics, John Wiley, NewYork, 1999.
3. J.K. Sharma : OR Theory & Applications, Mac Milian India Ltd., 1998.
4. G. Hadley : Linear Programming, Narosa Publishing House, New Delhi,1995.
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER–III
Inter Disciplinary Subject (IDS)
(Groups of Symmetries-I)
Effective from June 2012
Marks: 50 (15 internal + 35 external)
(3 hours / Week–Credit: 2)

Unit I:

Definition of a group, its elementary properties, order of a group, order of an element of a group, Group multiplication tables, Examples of groups including finite groups, infinite groups, Abelian groups, Cyclic groups.

Unit II:

Subgroup, condition that a subset is a subgroup, Examples of subgroups.
Basic concept of symmetry, Symmetry elements and symmetry operations in a space, Identity symmetry operation.

Unit III:

Symmetry planes and reflection symmetry, Inversion centre and inversion symmetry, Rotation axes and rotation symmetry, Improper axes and improper rotation symmetry, product of symmetry operations.

The course is covered by the following reference books:

1. F.A. Cotton: Chemical application of group theory, Wiley Inter Science
Wiley Eastern Ltd., New Delhi.
2. G.Davidson: Intro. Group Theory for Chemists, Applied Science
Publisher.
3. I.N.Herstein: Topics in Algebra, Wiley Eastern Ltd., New Delhi.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER–IV
Inter Disciplinary Subject (IDS)
(Groups of Symmetries-II)
Effective from June 2012
Marks: 50 (15 internal + 35 external)
(3 hour / Week–Credit: 2)

Unit I:

Formation of groups of symmetries (in space) of the following Plane figures(regarded as rigid objects):

1. An isosceles triangle (cyclic group C_2 of order 2)
2. An equilateral triangle (the group S_3 of order 6)
3. A rectangle (the group V_4 of order 4)
4. A square (the group D_4 of order 4)

Unit II:

Formation of groups of symmetries of the following Chemical Molecules (Configuration of atoms).

1. H_2O (The group V_4)
2. H_2O_2
3. Trans- $N_2 – F_2$ (the group V_4 of order 4)
4. NH_3, PCl_3, $CHCl_3$(The group S_3)

Unit III:

Concept of isomorphism of groups , Isomorphism of multiplicative group with the group C_2 of the symmetries of an isosceles triangle, Isomorphism of multiplicative group with the group V_4 of the symmetries of a rectangle, Isomorphism of group V_4 of the symmetries of a rectangle with the group of symmetries of H_2O, Isomorphism of group S_3 of the symmetries of an equilateral triangle with the group of symmetries of NH_3, PCl_3, $CHCl_3$.

The course is covered by the following reference books:

1. F.A. Cotton: Chemical application of group theory, Wiley Inter Science Wiley Eastern Ltd., New Delhi.
2. G.Davidson: Intro. Group Theory for Chemists, Applied Science Publisher, New Delhi.
3. I.N.Herstein: Topics in Algebra, Wiley Eastern Ltd., New Delhi.
