Solapur University, Solapur
Semester Pattern Syllabus
B.Sc.I
Mathematics
(w.e.f. June 2010)

For Undergraduate course as per the sanctioned workload of Thirty Six (36) Periods.

Class	Periods / Week	Marks
B.Sc.- I	9	250
B.Sc.- II	9	300
B.Sc.-III	18	600

Details of Re-Draft Syllabus of B. Sc. Part-I (MATHEMATICS)
Semester-wise pattern(Commencing from JUN – 2010)

B.Sc.I (Mathematics) (Honours) semester-wise pattern to be implemented from June 2010. This syllabus of Mathematics carries 250 marks. In semester –I university examination of Theory paper –I and paper-II (50 marks each) and in semester – II university examination of Theory paper – III and paper-IV (50 marks each) and the university examination of Problem Solving Session [PSS] - I will be held. The distribution of marks is as follows.

Semester -I
(1) **Paper-I   ALGEBRA**   (Marks 50)
(2) **Paper-II CALCULUS**   (Marks 50)

Semester -II
(3) **Paper –III GEOMETRY**   (Marks 50)
(4) **Paper –IV DIFFERENTIAL EQUATIONS**   (Marks 50)
(5) **Problem Solving Session [PSS - I]**
    Only annual examination (similar to Practicle) of **50 marks**.
Note:

1. Total teaching periods for Paper –I / III and Paper –II/ IV are five(5) per week for each semester.
2. Total teaching periods for PSS –I are four(4) per week for whole class as one batch.

Duration of Annual Examination :
   (i) For Paper –I / II (Two hours) in semester -I
   (ii) For Paper –III / IV (Two hours) in semester -II
   (ii) For PSS –I (Three hours for a batch of 20 students) annually.

Semester -I
Paper –I (Algebra)   40 Periods

Unit 1 : Matrices : Symmetric and Skew symmetric, Elementary transformations, Inverse of a Matrix, Rank of a Matrix, Characteristic equation of a matrix, Cayley Hamilton theorem and its use in finding the inverse of a matrix.   **[10]**

Unit 2 :Linear Equations : Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations. Eigen values and eigen vectors.   **[10]**

Unit 3 : Complex Number : Modulus and Argument of a Complex Number, DeMoivre's theorem and its applications, Roots of Unity, Roots of Complex Numbers.   **[10]**

Unit 4 : Transcendental Functions : Circular Functions with their inverses and Hyperbolic function of a complex variable along with their inverses.
[10]

Paper –II (Calculus)   40 Periods

Unit 1 : Differentiation: Successive differentiations, Leibnitz rule. **[10]**

Unit 2: Mean Value Theorems : Rolle's theorem (statement only) , Lagrange's and Cauchy MVT, Taylor's theorem (statement only) , Maclaurin's and Taylor's series expansions e^x, cos x, sin x, $(1+x)^n$, log(1+x)
                                    [10]

Unit 3: Function of two variables : Limit and Continuity of functions of two variables, Partial derivative, partial derivative of higher orders, Homogeneous functions, Euler's theorem on Homogeneous functions.   **[10]**

Unit 4 :Vector Calculus : Scalar point function, Vector point function, Directional derivative, Gradient , divergence and Curl and its properties.
                                    [10]

Semester -II
Paper –III (Geometry)   (40 Periods)

Unit 1 :-Plane : General equation of plane, Normal equation, Intercept form Angle between two planes, Plane through three points, Plane through a given point, Sides of a plane, Distance of a point from a plane, Family of planes.   **[15]**

Unit 2 :- Line : Symmetric and asymmetric form, Angle between two lines, Angle between Line and plane , Intersections of a line and plane, Condition for the intersection of two lines, Condition for a line to lie in a plane.
                                                                          [10]

Unit 3 : Sphere: Centre radius form, General form , Diameter form, Four point form(only example), Intersection of a line with sphere, Power of point and condition tangency, Radical plane of two spheres, Family of spheres $S+\lambda S'=0$, $S+\lambda P=0$.   **[15]**

Paper -IV (Differential Equation)   40 periods

Unit 1 :- Differential Equations of first order and first degree :[Part-I]
 Variables separable, Homogeneous, non- homogeneous differential equations.
                                                                          [10]

Unit 2 :- Differential Equations of first order and first degree :[Part-II]
Exact differential equations. Necessary and sufficient condition for exactness, Integrating factor with four rules, Linear differential equations of the form. $dy/dx +py=Q$;
Bernoulli's Equation $dy/dx + Py=Qy^{n}$.   **[10]**

Unit 3 :- Linear Differential Equations With Constant Coefficients :[Part-I]
Complementary function and particular integral, General solution of $f(D)y=X$, Solution of $f(D)y=0$ for non-repeated , repeated, real and complex root.   **[10]**

Unit 4:- Linear Differential Equations With Constant Coefficients : [Part-II]
        Solution of $f(D)y=X$, where X is of the form
           e^{ax}, $\sin(ax)$, $\cos(ax)$, x^{m}, $e^{ax}V$, xV **[10]**

Problem Solving Session [PSS] -I

4 Periods per week.

Assignment –1 : Rank of Matrix a) Echelon form b) Normal Form

Assignment –2 : Inverse of Matrix by Adjoint Method

Assignment –3 : Inverse of Matrix by Cayley-Hamilton Method.

Assignment –4 : Solution of system of Linear Homogeneous Equation

Assignment –5: Solution of system of Linear non-homogeneous Equation.

Assignment –6 : Eigen values and Eigen vectors.

Assignment– 7: Applications of Demoivre's Theorems

Assignment –8 : Leibnitz Rule

Assignment – 9 : Family of Planes

Assignment –10 : Family of Spheres

Assignment –11 : Integrating factors.

Assignment –12 : Short methods for Particular Integrals.

Solapur University, Solapur
Nature of Question Paper For Semester Pattern
- ## Faculty of Science
(w.e.f. June 2010)

Time :- 2 hrs.   **Total Marks-50**

Q. No.1)   **Multiple choice questions.**   **(10)**
    1)   --
         a)   **b)**   **c)**   **d)**
    2)
    3)
    4)
    5)
    6)
    7)
    8)
    9)
    10)

Q.No.2)   **Answer any Five of the following**   **(10)**
    i)
    ii)
    iii)
    iv)
    v)
    vi)

Q.No.3)   **A) Answer any Two of the following**   **(06)**
    i)
    ii)
    iii)
    B) Write the Answer/Solve/Problem/Note   **(04)**

Q.No.4)   **Answer any Two of the following**   **(10)**
    i)
    ii)
    iii)

Q.No.5)   **Answer any Two of the following**   **(10)**
    i)
    ii)
    iii)

Problem Solving Session- I [PSS- I]

There is ONE PSS-I of 3 hours for a batch of 20 students at the end of the year. (similar to Practicle)

Problem Solving Session [PSS – I] Marks 50
Q.1 Attempt any 4 out of 8   10 marks each (40marks)
                              Journal   (10 marks)
                              Total   (50 marks)

Reference   Books

Semester - I
        Paper -I   : Algebra
        Paper -II   : Calculus
Semester - II
        Paper - III : Geometry
        Paper - IV : Differential Equations.

        Problem Solving Session – I [PSS – I]

1. Algebra and Geometry by R. B. Kulkarni , J. D. Yadav , S. J. Alandkar, N. I. Dhanshetti. (SUMS Publication) B.Sc.-I Paper-I
2. Algebra and Geometry (B.Sc.-I Paper-I) by L. G. Kulkarni , Dr. B. P. Jadhav ,Dr. Mrs. P. D. Patwardhan , Dr. M. K. Kubade. [Phadke Prakashan]
3. Text Books of Matrices by Shanti Narayan.
4. A Text Book of Analytical Geometry of Two dimensions, by P. K. Jain and Khalil Ahmid , Wiley Eartern Ltd. 1994.
5. Calculus and Differential Equations (B.Sc. –I ,Paper –II)
   By H. T. Dinde , A. D. Lokhande , P. D. Sutar , U. H. Naik.(SUMS Pub.)
6. Calculus and Differential Equations (B. Sc. I , Paper- II)   by L. G. Kulkarni ,Dr. B. P. Jadhav , Dr. Mrs P. D. Patwardhan , Dr. M. K. Kubade [Phadke Prakashan]
7. Differential Calculus by Shanti Narayan
8. A text book of Vector Calculus , by Shanti Narayan.
9. Differential equations, by G. S. Diwan, D. S. Agashe. Popular Prakashn , Bombay.
10. Introductory course in Differential Equation by D. A. Murray Orient Longman

1. Structure of the courses :-

A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
B) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. Nature of question paper:
A) Nature of questions.
"20% Marks - objectives question" **(One mark each and multiple choice questions)**
"40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. **(2 to 5 Marks each)**
"40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**
B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each.**
C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option. **for questions 2 to 5.**
3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.