VIVEKANANDA COLLEGE
College with Potential for Excellence
(Residential & Autonomus – A Gurukula Institute of Life-Training)
(Affiliated to Madurai Kamaraj University)
Reaccredited with ‘A’ Grade (CGPA of 3.59 out of 4.00) by NAAC
TIRUVEDAKAM WEST, MADURAI DISTRICT – 625 234

DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS
SYLLABUS

Choice Based Credit System

(For those who joined in June 2014 - 2015 and after)
ABOUT THE COLLEGE

Vivekananda College was started by Founder-President Swamiji Chidbhavanandhaji Maharaj of Sri Ramakrishna Tapovanam, Tirupparaithurai, Trichy in 1971 on the banks of the river Vaigai which is blissfully free from the noise and hurry, the crowds and distraction of the city.

Vivekananda College is a residential college functioning under Gurukula pattern. It is Man-making education, that is imparted in this institution, Culture, character and curriculam are the three facets of ideal education that make man a better man. This is possible only when the teacher and taught live together, The Gurukula system of Training is therefore a humble and systematic attempt in reviving the age old GURUGRIHAVASA for wholesome education, Attention to physical culture, devotion to duty, obedience to teachers, hospitality to guests, zest for life, love for the nation, and above all, humility and faith in the presence of God etc. are the values sought to be inculcated. All steps are taken to ensure the required atmosphere for the ideal life training.

Vivekananda College, Tiruvedakam West, Madurai District-625 234 is an aided college established in 1971 and offers UG and PG courses. This College is affiliated to the Madurai Kamaraj University, Madurai. The College was reaccredited with ‘A’ grade (CGPA 3.59 out of 4.00) by NAAC in September 2015. The College was awarded College with Potential for Excellence by UGC in April 2016.

VISION AND MISSION

Our Vision: To raise an army of neo-graduates steeped in the hoary culture of the motherland and dedicated to serving her as potential leaders in the manifold spheres of national effort.

Our Mission: A harmonious enrichment of physical, emotional and intellectual facets of a student’s personality to bring out his inherent PERFECTION.

OBJECTIVES OF THE INSTITUTION

1. To inculcate spiritual, ethical, moral and social values in all disciplines of study.
2. Simultaneous education of the Hand, Heart and Head. Only a sound body can hold a sound mind.
3. Provide opportunities for all round development of the students and excellence in higher education, research and extension in different disciplines.
4. Disseminate the findings of research to the community to facilitate its development.
5. To provide society citizens of sterling character.
6. To cater to the needs of the educationally backward people – the most backward, scheduled caste and tribe.
GURUKULA ADMINISTRATIVE SET UP

Secretary
Swami Niyamananda Maharaj

Principal
Dr. B. Ramamoorthy

Vice-Principal & NAAC Coordinator
Dr. S. Raja

Dean & Controller of Examinations
Dr. E. Jayakumar

IQAC Coordinator
Dr. S. Raja

IGNOU Coordinator
Sri. V. Parthasarathy

ICT Coordinator
Dr. N. Nagendran

Grievence Cell Coordinator
Dr. T. Kaliappan

Sessional Examination
Sri. P. Jayasankar, HOD of Physics

Sri. N.S. Lakshmikanthan

Sri. V. Rajendarn

Dr. N. Meenakshisundaram

Sri. S. Ganeshan

Sri. S. Kalimuthu

I Eligibility for Admission

Admission to B.Sc. – Mathematics Programme is open to candidates with +2 pass with Maths, Physics, Chemistry & Biology as major subjects.

For B.Sc.-Mathematics course offered in the college, a pass in the Higher Secondary Examination conducted by the Government of Tamil Nadu or an examination accepted as equivalent there to by the Syndicate of the MKU, subject to such conditions as may be prescribed therefore.

II Duration

The course is for a period of three years. Each academic year shall comprise of two semesters viz. Odd and Even semesters. Odd semesters shall be from June to November and Even Semesters shall be from December to April. There shall be not less than 90 working days which shall comprise 450 teaching clock hours for each semester (Exclusive of the days for the conduct of university end-semester examinations) for each semester.

III CBCS System

All Programmes offered in the college are run on Choice Based Credit System (CBCS). It is an instructional package developed to suit the needs of students to keep pace with developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

IV Semesters:

An academic year is divided into two semesters. In each semester, courses are offered in 15 teaching weeks. Each week has 30 working hours spread over 6 days a week.

V Credits:

The term 'Credit' refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. The total minimum credits, required for completing the B.Sc. Programme is 140. The details of credits for individual components and individual courses are given in the above table.
VI Course:
Each Course is to be designed variously under lectures / laboratory / seminar / practical training / assignments to meet effective teaching and learning needs.

VII Examinations:
i). There shall be examinations at the end of each semester, for odd semesters in the month of October / November; for even semesters in April/May. A candidate who does not pass the examination in any course(s) shall be permitted to appear in such failed course(s) in the subsequent examinations to be held in October / November or April/May.

ii). A candidate should get registered for the first semester examination. If registration is not possible owing to shortage of attendance beyond condonation limit / regulations prescribed or belated joining or on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after the completion of the programme.

VIII Condonation
Students must have 75% of attendance in each paper for appearing the examination. Students who have 65% to 74% of attendance shall apply for condonation in the prescribed form with the prescribed fee. Students who have 50% to 64% of attendance shall apply for condonation in prescribed form with the prescribed fee along with the Medical Certificate. Students who have below 50% of attendance are not eligible to appear for the examination. They shall compensate the shortage after the completion of the programme.

IX Question Paper Pattern
Time: 3 Hours
Maximum Marks: 75

SECTION-A (10 X 1 = 10 Marks)
Answer All Questions
(1-5) Multiple Choice
(6-10) Short Answer Questions
Two questions from each unit

SECTION-B (5 X 7 = 35 Marks)
Answer All Questions
(11-15) Questions shall be in the format of either (a) or (b)
One question from each unit

SECTION-C (3 X 10 = 30 Marks)
Answer any THREE Questions
(16-20) one question from each unit.

X Evaluation:
Performance of the students are evaluated objectively. Evaluation is done both internally and externally. They will be assessed continuously through Internal Assessment System and finally through summative (end) semester examination. To assess internally, there will be three examinations conducted centrally with a duration of two hours for each paper. In addition to continuous evaluation, the summative semester examination, which will be a written examination of three hours duration,
would also form an integral component of the evaluation. The ratio of marks to be allotted to continuous internal assessment and to end semester examination is 25: 75.

The pattern of internal valuation shall be:

Test: 20 Marks (the average of best two tests out of three tests)
Assignment: 5 marks
Total: 25 marks.

In respect of practical papers, the ratio of marks to be allotted to internal assessment and to summative (end) semester examination is 40 : 60. The internal marks will be calculated on the basis of marks secured at the model examination and marks awarded for the preparation of practical note book. The external marks will be calculated on the basis of the marks awarded by the internal examiner and the external examiner at the summative semester examination.

XI Passing Minimum:

There is no passing minimum for Internal Assessment. The passing minimum for external Examinations shall be 27 out of 75 marks and passing minimum for a paper is 40%.

XII Classification of Students:

Candidates who have secured not less than 40% of marks in each paper shall be declared to have passed in that paper. Candidates who obtain 40% and above but below 50% shall be declared to have passed in Third Class. Candidates who obtain 50% and above but below 60% of the aggregate marks in Part-III shall be declared to have passed in Second Class and those who obtain 60% of marks and above shall be placed in the First Class. Candidates who obtain 75% and above shall be declared to have passed in Distinction provided he has not re-appeared for any paper during the course of the study.

XIII Failed Candidates:

A candidate who has arrears in any paper in a semester examination will be permitted to proceed to the next semester classes. A candidate who has arrears may appear again in these failed papers at the November/April examinations. The internal assessment marks already obtained by him shall be carried over for the subsequent appearance also.

XIV Improvement of Internal Marks:

The student desirous of improving the internal assessment marks may request the Head of the Department. After obtaining permission from the Staff Council Meeting by the Head, the student may write improvement examinations in consultation with the course teacher. The marks obtained (when it is more than the previous marks) will be submitted to the Controller of Examinations for further adoption.

XV Study Tour

Students are expected to participate in the field visit and the study tours organized by the department. Though study tour/field trip carries no credit, it is compulsory for the students to attend whereby the students can get an opportunity to gain practical knowledge. As such, observational visit to selected social welfare organizations, industries, trade centres, exhibitions, places of historical importance and the like will be considered as extra-curricular activities.
DEPARTMENT OF MATHEMATICS

Vision:
To raise battalion of Maths graduates equipped with logical thinking and tender heart to serve our motherland as potential leaders in the manifold spheres of national effort.

MISSION:
Enriching the mental, emotional and intellectual facets of maths students to cope up with any career that they choose and to strive to attain perfection in life.

OBJECTIVES:
1. To develop the students’ mental faculty to appreciate and enjoy the logical reasoning and hidden connections while learning Mathematics.
2. To provide ample opportunities to excel in learning Mathematics so that he can shine brightly in higher education, research or career that he chooses.
3. To encourage and provide ample opportunities to the Maths students to disseminate his Mathematical knowledge to the younger and tender students community in rural areas.
4. To provide ample mathematically – oriented activities to the students to inculcate spiritual, ethical, moral and social values so that his Hand, Heart, and Head functions inter connectedly and harmoniously.
5. In short, to provide society, citizens of sterling character with sharp intellect.

HISTORY:
Maths was taught as a subject in Preuniversity classes from 1971 onwards – that was the year the college started functioning. Maths as Ancillary subject was offered from the inception of B.Sc. Physics degree, that is from the year 1973-74. From 1980-81 onwards B.Sc Degree in Maths major was offered and so Maths department became a full-fledged one. The college became autonomous in june 1987. So the department had freedom to chart its own course. Syllabus was framed in 1987 and updated periodically to cater to the career needs of the students. But while framing and updating the syllabus, Maths department has always kept in mind the main stake holders are rural students, so Fundamental Mathematics was always a part of the syllabus. When the need arose Computer Oriented Papers, Competitive Mathematics, Operations Research, Vedic Mathematics, Value Education, Environmental Science etc were also incorporated in the syllabus.

The department also did not fall back in repaying its social oblications. Our students, guided by the department teachers, become resource persons to teach Mathematical Concepts, Vedic Maths, yoga etc to the school students. Learning becomes easier by Laboratory Activities and by building Mathematical Models. Our students practise this and their innovations are exhibited and explained in the three day Mathematics Exhibition for Rural Masses once in 2 years. Our student are encouraged to participate enthusiastically in all the college endeavours and activities like NSS, NCC, controlling the crowd during functions and festival times, election duties, temple cleanliness etc.
## SCHEME OF EXAMINATION
*(For those who joined in June 2013 and after)*

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST– 625 234

Reaccredited with ‘A’ Grade (CGPA of 3.59 out of 4.00) by NAAC
(Residential & Autonomous – A Gurukula Institute of Life-Training)
(Affiliated to Madurai Kamaraj University)

DEPARTMENT OF METHEMATICS
CBCS - DISTRIBUTION OF CREDIT
B.Sc. Mathematics
(For those who joined in June 2013 and after)

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FACULTY MEMBERS

Sri. P.NATARAJAN, M.Sc., B.Ed., M.Phil.,
Head & Associate Professor of Mathematics

Sri. G.SANJEEVI, M.Sc., B.Ed., M.Phil.,
Associate Professor of Mathematics

Dr. C. RAJAN, M.Sc., M.Phil., B.Ed., Ph.D.,
Assistant Professor of Mathematics

Sri. P. MADASAMY, M.Sc., M.Phil.
Assistant Professor of Mathematics

Sri. T.PONNU SAMY, M.Sc., M.Phil.,
Assistant Professor of Mathematics

Sri. R.MOHANAKRISHNAN, M.Sc.,
Assistant Professor of Mathematics
B.Sc. Mathematics CBCS Syllabus - SEMESTER – I
(For those who joined in June 2014 and after)

### PART – III : Core Subject Theory

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**Objective:**

- To develop the skill in basic Mathematics.

**Algebra**

**Unit – I:**


**Unit – II:**

- Reciprocal equations – synthetic division – decreasing and increasing the roots – removal of terms – to form an equation whose roots are any power of the roots – transformation in general.

**Unit – III:**

- Descarte’s rule of signs – Rolle’s Theorem – multiple roots – finding approximate root using Horner’s method

**Trigonometry**

**Unit – IV:**


**Unit – V:**

- Logarithm of complex numbers – summation of series: (C+iS method only)

**Text book:**

- Trigonometry by T.K.Manicavachagampillai, Viswanathan, printers and publishers Pvt. Ltd., Chennai. For units IV, V - relevent chapters.

**Reference Book:**

- Algebra by Dr. S. Arumugam, New gamma Publishing House, Palayankottai
- Trigonometry by Dr. S. Arumugam & Thangapandi Issac, New gamma Publishing House, Palayankottai.
Objective:

❖ To develop the skill in Solving problems

Unit-I:


Unit-II:

Successive differentiation – the $n^{th}$ derivative – standard results – formation of equation involving derivatives – Leibnitz formula for the $n^{th}$ derivative of a product and related problems

Unit-III:


Unit-IV:

Curvature – circle, radius and centre of curvature – cartesian formula for the radius of curvature – the coordinates of centre of curvature – evolute and involute – radius of curvature when the curve is given in polar co-ordinates – pedal equation of a curve – chord of curvature.

Unit-V:


Text Book:


Reference Book:

✓ Calculus by Dr. S.Arumugam, New Gamma publishing house, Palayamkottai.
PART – IV : Non Major Elective

<table>
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**Objective:**

- *To develop the skill in Basic Mathematics.*

**Unit-I**
Theory of indices – ratio and proportion.

**Unit-II**
Distance between two points – equation of a line – different forms [except normal form].

**Unit-III**
Theory of matrices – addition, multiplication of two matrices.

**Unit-IV**
Finding the $n^{th}$ term and sum to $n$ terms of an A.P and G.P – arithmetic mean and geometric mean.

**Unit-V**
Solving the quadratic equations – finding the roots – forming the equation when the roots are given (only second degree).

**Text Book:**

- Business mathematics by Dr.M.Manoharan & Dr.C.Elango Palani Paramount publications, Palani.2006 Edt.

**Reference Book**

- Business Mathematics by Dr.V.R.Vittal, Margham publications Chennai.
Objective:

- To develop the skill of solving problems.

Unit-I:
Integration – introduction – definite integral – methods of integration – integral of function containing linear function of \( x \) – integrals of the form \( \int F[f(x)] f'(x)dx \) – integration of rational, irrational and algebraic functions.

Unit-II:
Properties of definite integrals – integration by parts – reduction formulae: for integrands \( x^n e^{ax}, x^n \cos ax, \sin^n x, \cos^n x, \sin^m x \cos^n x, \tan^n x, \cot^n x, \sec^n x, \cosec^n x \).

Unit – III

Unit – IV

Unit -V
Fourier series – definition – even and odd functions – expanding \( f(x) \) as Fourier series in \((- \pi, \pi), (0, 2\pi)\) – half range series – development of cosine and sine series – change of interval – expanding \( f(x) \) as fourier series in \((-l, l), (0, 2l) \) and \((0, l)\).

Text Book:


Reference Book:

- Calculus by Dr.S.Arumugam New Gamma Publishing House, Palayamkottai.
PART – III : Core Subject Theory

| Subject Title: Analytical Geometry (3D) and Vector Calculus |
|-----------------|-----------------|-----------------|
| Subject Code:   | Hours per week: | Credit:         |
| 05CT22          | 5              | 4              |
| Sessional Marks: | 25             | Summative Marks: | 75 |
|                 |                 | Total Marks: 100 |

Objective:

❖ To develop the skill in solving problems.

Unit I – Coordinate system and planes – rectangular cartesian coordinates – direction cosines – direction ratios – angle between two lines – condition for parallelism and perpendicularity – planes – equation of a plane – different forms – general form, three point form; intercept form, normal form – angle between two planes – length of the perpendicular from a point to a plane – angle bisectors of two planes.

Unit II Straight line – equation of a straight line-different forms – non-symmetric form, symmetric form, two point form – a plane and a line – coplanar lines – condition for coplanarity – angle between a line and a plane – equation of a plane containing two lines – length of the perpendicular from a point to a line – skew lines – shortest distance between two skew lines.

Unit III The Sphere – equation of a sphere – different forms – centre radius form, diameter form – tangent line and tangent plane – angle of intersection of two spheres – section of a sphere.


Unit V Line and surface integrals – vector integration – line integrals – work done by a force – surface integrals – integral theorems – Green’s theorem in plane, Stoke’s theorem, Gauss divergence theorem (without proof) – verification of these theorems – simple problems.

Text Book:


Reference book:

B.Sc. Mathematics CBCS Syllabus - SEMESTER – II
(For those who joined in June 2014 and after)

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**Objective:**

- To develop the skill in solving problems.

**Unit-I:** Averages – mean, median, mode.

**Unit-II:** Deviation – quartile deviation – standard deviation.

**Unit-III:** Graphical solution of a L.P.P.

**Unit-IV:** Transportation problem.

**Unit-V:** Assignment problem.

**Text Book:**


**Reference Books:**

Objective:

- To develop the skill in solving differential equations.

UNIT I


UNIT II

Linear differential equations with constant coefficients – particular integrals of the form $e^{ax}$, $\cos ax$, $\sin ax$, $x^n$, $e^{ax}V$ – equations with variable coefficients – equations reducible to the linear homogenous equations.

UNIT III


UNIT IV

Laplace transformations – the inverse Laplace transformations – solving differential equations using Laplace transformations.

UNIT V


Text Book:


Reference Book:

- Differential equations, by Dr.S.Arumugam, New Gamma Publishing House, Palayamkottai.
B.Sc. Mathematics CBCS Syllabus - SEMESTER – III
(For those who joined in June 2014 and After)

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**Objective:**

❖ To develop the skill of solving problems.

**UNIT I**


**UNIT II**


**UNIT-III**


**UNIT-IV**


**UNIT-V**


**Text Books**

✓ Numerical Analysis, by Dr.S.Arumugam, Prof. A.Thangapandi Issac and Dr. A. Somasundaram. New Gamma Publishing House, Palayamkottai.

**Reference Book**

✓ Numerical Methods, by A.Singaravelu, Meenakshi Agency – Chennai.
B.Sc. Mathematics CBCS Syllabus - SEMESTER – III
(For those who joined in June 2013 and after)

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Objectives:

- To understand the theory of Computers.
- To develop the skill in writing Programmes.

UNIT I:


UNIT II:


UNIT III:

Arrays – one, two and multi-dimensional arrays – string handling – reading, writing, comparison and concatenation of strings – table of strings.

UNIT IV:


UNIT V:

Pointers – accessing address of a variable – pointer expressions – pointers and scale factors – pointers in arrays, strings, functions and structures – files – opening and closing a file – input/output operations on files – random access to files.

Text book:


Reference Book:

B.Sc. Mathematics CBCS Syllabus - SEMESTER - III
(For those who joined in June 2014 and after)

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**List of Problems for Lab**

**Programming in C: Practical**

1. Program to calculate the area of a triangle.
2. Program to find whether the given number is odd or even using ‘if…else…’ statement.
3. Program to find the biggest among three given numbers using ‘nested if’ statement.
4. Program to sum of the digits of a given number.
5. Program to reverse a number using ‘while’ loop.
6. Program to check whether the given number is prime or not using ‘for’ loop.
7. Program to prepare students mark statement.
8. Program to sum the series (1+2+3+…….+ n)
9. Program to sum the series (1/1+1/2+1/3+….+1/n)
10. Program to generate Fibonacci series.
11. Program to sort an array in ascending order using one dimensional array.
12. Program to sort an array in descending order using one dimensional array.
13. Program to add two matrices using two dimensional arrays.
14. Program to multiply two matrices using two dimensional arrays.
15. Program to calculate the factorial value of a number using recursive function.
B.Sc. Mathematics CBCS Syllabus - SEMESTER – III
(For those who joined in June 2014 and after)

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Objective:

❖ To develop the knowledge in logic.

UNIT I

Introduction – statements and notations – connectives

UNIT II

Statement formulae – well formed formulae

UNIT III

Tautology

UNIT IV

Equivalence of formula – truth table method – replacement process

UNIT V

Law of duality – tautological implications

Text Book

✓ Discrete Structures and Graph Theory by Gajavelli. S.S. Bhisma Rao, Scitech Publications (India) Ltd. Chennai-600 017

Reference Book

✓ Discrete Mathematics by Dr.M.K.Venkataraman, Dr.N.Chandra Sekaran, Dr.N.Sridharan, the National Publishing Company Chennai.2003-Edition
B.Sc. Mathematics CBCS Syllabus - SEMESTER – IV  
(For those who joined in June 2013 and After)

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**Objective:**

- *To develop the skill of solving problems.*

**UNIT I:**


**UNIT II:**


**UNIT III:**

- Cauchy’s first limit theorem – Cesaro’s theorem – Cauchy’s second limit theorem – subsequences – limit points – Cauchy sequences (upper and lower limit of a sequence not included).

**UNIT IV:**

- Series of positive terms – convergence – Cauchy’s general principle of convergence – comparison test, Kummer’s test, D-Alembert’s ratio test, Gauss’ test, Cauchy’s root test, Raabe’s test, Cauchy’s condensation test (proofs of tests not included) – simple problems.

**UNIT V:**


**Text Book:**

- Sequences and Series by Dr. S. Arumugam. New Gamma Publishing House, Palayamkottai.

**Reference Book:**

B.Sc. Mathematics CBCS Syllabus - SEMESTER – IV
(For those who joined in June 2013 and After)

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**Objective:**

❖ *To develop the skill in solving problems.*

**Unit – I**

Projectiles – path of the projectile, range, etc. – velocity of the projectile in magnitude and direction at the end of time $t$ – range on an inclined plane – enveloping parabola.

**Unit – II**


**Unit – III**


**Unit – IV**


**Unit – V**

Moment of inertia – theorems on parallel and perpendicular axes – moments of inertia in some particular cases – Dr.Routh’s rule.

**Text Books:**

✓ Dynamics by M.K. Venkataraman – Chapters: 6, 8 (sections 8.1 to 8.8), 10, 11 &12 (Agasthiar Publications Trichy)

**Reference Book:**

Objective:

To develop the skill of knowledge in computers and writing programmes.

Unit I: Basic concepts of Object Oriented Programming (OOP) – benefits of OOP – applications of OOP – operators in C++


Text Book:


Reference Book:

B.Sc. Mathematics CBCS Syllabus - SEMESTER - IV
(For those who joined in June 2014 and after)

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**List of Problems for Lab**

**Object Oriented Programming with C++: practical**

1. Program to convert Fahrenheit into Celsius.
2. Program to swap two numbers without third variable.
3. Program to find whether the given year is leap or not using ‘if...else...’ statement.
4. Program to find the commission of sales using ‘simple if’ statement.
5. Program to print odd numbers up to a range using ‘while’ loop.
6. Program to find the factorial of a given number using ‘for’ loop.
7. Program to generate Fibonacci series using ‘do...while’ loop.
8. Program to generate the pyramid of digits.
9. Program to check whether the given number is a perfect number or not.
10. Program to calculate nCr value using ‘function’.
11. Program to explain ‘function overloading’.
12. Program to find the sum of three numbers using ‘class’.
13. Program to perform various arithmetic operations using ‘member functions’ inside the ‘class’.
14. Program to display the basic details of a person using ‘class’.
15. Program to explain ‘static data members’ of ‘a class’.
B.Sc. Mathematics CBCS Syllabus - **SEMESTER IV**
*(For those who joined in June 2013 and after)*

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**Objective:**

❖ *To develop the skill of solving problems in competitive exams.*

**UNIT I:**
HCF and LCM of numbers – decimal fractions.

**UNIT II:**
Square roots and cube roots – averages.

**UNIT III:**
Problems on ages – percentage.

**UNIT IV:**
Profit and loss – ratio and proportion.

**UNIT V:**
Partnership.

**Text Book:**

✓ Quantitative Aptitude for Competitive Examinations by Dr. R.S. Aggarwal, S. Chand & Company Pvt. Ltd., New Delhi.

**Reference Book:**

PART – III : Core Subject Theory
Subject Title : STATISTICS

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**Objective:**

✧ *To develop the skill in solving problems.*

**UNIT I:** Correlation and regression – Karl Pearson’s coefficient of correlation – rank correlation – regression lines – properties of regression coefficients.


**UNIT III:** Some special distributions – binomial, Poisson and normal distributions – moment generating function – mean, mode, standard deviation – recurrence relation for central moment – addition property – fitting of the distribution – area property of normal distribution – limiting cases.

**UNIT IV:** Tests of significance (small samples) – tests of significance based on t-test, F-test.

**UNIT V:** Tests of significance based on \( \chi^2 \) - distribution – sampling distribution – testing of hypothesis – Chi-square test for population variance – goodness of fit – independence of attributes.

**Text Book:**

✓ Statistics by Dr. S. Arumugam and Prof. A. Thangapandi Isaac, New Gamma Publishing House, Palayamkottai.

**Reference Book:**

B.Sc. Mathematics CBCS Syllabus - SEMESTER – V: Paper - II
(For those who joined in June 2014 and after)

<table>
<thead>
<tr>
<th>PART – III : Core Subject Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject  Title: <strong>Modern Algebra</strong></td>
</tr>
<tr>
<td>Subject Code: <strong>05CT52</strong></td>
</tr>
<tr>
<td>Hours per week: <strong>5</strong></td>
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<tr>
<td>Credit: <strong>5</strong></td>
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<tr>
<td>Sessional Marks: <strong>25</strong></td>
</tr>
<tr>
<td>Summative Marks: <strong>75</strong></td>
</tr>
<tr>
<td>Total Marks: <strong>100</strong></td>
</tr>
</tbody>
</table>

**Objective:**

- To develop the skill of understanding of definitions and theorems.

**Unit I:**

Relations and mappings.

**Unit II:**

Definition of groups – examples – elementary properties – permutation groups – subgroups and cyclic groups.

**Unit III:**

Order of an element – cosets and Lagrange’s theorem – normal sub groups – quotient groups.

**Unit IV:**

Isomorphism and homomorphism of groups.

**Unit V:**


**Text Book:**

- Modern Algebra by Dr. S. Arumugam and Prof. A. Thangapandi Isaac, Scitech Publications Pvt. Ltd., Chennai.

**Reference Book:**

Objective:

❖ To develop the skill of understanding definitions and theorems.

UNIT I:


UNIT II:


UNIT III:

Complete metric space – Baire’s category theorem – continuity – homeomorphism – uniform continuity – discontinuous functions on R.

UNIT IV:

Connectedness – definition and examples – connected subsets of R – connectedness and continuity.

UNIT V:


Text Book:

✓ Modern Analysis by Dr.S.Arumugam, and A.Thangapandi Issac, New Gamma Publishing House.

Reference Book:

✓ Principles of Real Analysis By Chandra Sekara Rao
B.Sc. Mathematics CBCS Syllabus - SEMESTER – V  
(For those who joined in June 2014 and After)

<table>
<thead>
<tr>
<th>Part – III : Core Subject Theory</th>
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</thead>
<tbody>
<tr>
<td>Subject Title: STATICS</td>
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<tr>
<td>Subject Code: 05CT54</td>
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<tr>
<td>Hours per week: 5</td>
</tr>
<tr>
<td>Credit: 5</td>
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<tr>
<td>Sessional Marks: 25</td>
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<tr>
<td>Summative Marks: 75</td>
</tr>
<tr>
<td>Total Marks: 100</td>
</tr>
</tbody>
</table>

Objective:

\( \blacktriangledown \) **To develop the skill in solving problems.**

UNIT I:

Introduction – force – types of forces – equilibrium – principle of transmissibility – forces acting at a point – parallelogram law of forces – triangle law of forces – polygon law of forces – Lami’s theorem – \((\lambda-\mu)\) theorem – resolution of forces – components of forces – resolved parts – resultant of any number of forces acting at a point – condition of equilibrium of any number of forces acting at a point.

UNIT II:


UNIT III:

Equilibrium of three forces acting on a rigid body – conditions of equilibrium – two trigonometrical theorems – solving statical problems (simple problems) – coplanar forces – reduction of coplanar forces – conditions for a system of coplanar forces to reduce to a single force or to a couple – equation to the line of action of the resultant – conditions of equilibrium of a system of coplanar forces (simple problems only).

UNIT IV:


UNIT V:

Equilibrium of strings – equation of the common catenary – tension at any point – important formulae – geometrical properties of the catenary – approximations – parabolic catenary – suspension bridge.

Text Book:

✓ Statics by M.K. Venkataraman – (Chapters: 1, 2, 3, 4, 5, 6, 7 & 11), Agasthiar publications Trichy.

Reference Book:

✓ Mechanics by P.Duraipandian, Laxmi Duraipandian, S. Chand and company Pvt.
PART – III : Elective Subject

Subject Title : LINEAR PROGRAMMING

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Hours per week</th>
<th>Credit</th>
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<tbody>
<tr>
<td>05EP51</td>
<td>5</td>
<td>5</td>
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</table>

Sessional Marks: 25  Summative Marks: 75  Total Marks: 100

Objectives:

- To develop the skill in forming models,
- To develop the skill in Solving Problems.

UNIT I:

Linear Programming Problem – mathematical formulation of the problem – LPP-graphical solution method – some exceptional cases – general LPP – canonical, standard forms of LPP.

UNIT II:


UNIT III:


UNIT IV:


UNIT V:


Text Book:


Reference book:

Objective:

- To develop the skill of solving problems in Competitive Exams.

Unit-I:

Time and work – time and distance

Unit –II:

Problems on trains

Unit – III:

Simple interest – compound interest

Unit – IV:

Logarithms – calendar

Unit – V:

Clocks – stocks and shares.

Text Book:


Reference Book:

SEMESTER – V
(For those who joined in June 2014 and after)

<table>
<thead>
<tr>
<th>Part – IV : Common Subject Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title: Environmental studies</td>
</tr>
</tbody>
</table>

Subject Code: **ESUG51**  
Hours per week: **2**  
Credit: **2**

Sessional Marks: **25**  
Summative Marks: **75**  
Total Marks: **100**

2hrs/week 24hrs

Objectives:

- Disseminate information of Environment of national and international issues
- Environmental consciousness creation among the students
- Facilitation of environmental leadership among students

Unit-I: 5 hrs

Introduction – Nature, scope and importance of Environmental studies – Natural Resources and conservation – forest, water and energy.

Unit-II: 5 hrs

Ecosystem – concept – structure and function, energy flow, food chain, food web and ecological pyramids

Unit-III: 5hrs

Biodiversity – definition, types – values – India, a mega diversity zone – Hotspots – Endangered and endemic species – threat to biodiversity and conservation

Unit-IV: 5 hrs


Unit-V: 4hrs


Text books

B.Sc. Mathematics CBCS Syllabus - SEMESTER – VI: PAPER - I
(For those who joined in June 2014 and after)

<table>
<thead>
<tr>
<th>PART – III: Core Subject Theory</th>
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</thead>
<tbody>
<tr>
<td>Subject Title: <strong>Linear Algebra</strong></td>
</tr>
<tr>
<td>Subject Code: <strong>05CT61</strong></td>
</tr>
<tr>
<td>Sessional Marks: <strong>25</strong></td>
</tr>
</tbody>
</table>

**Objective:**

- To develop the skill of solving problems.


**Unit-II:** Inner product spaces – definition and examples – orthogonality – orthogonal complement.


**Unit – IV:** Simultaneous linear equations – characteristic equation – Cayley Hamilton theorem – eigen values and eigen vectors.

**Unit – V:** Matrix of a linear transformation – relation between multiplication of matrices and the composition of their linear transformations – bilinear forms – quadratic forms.

**Text Book:**

- Modern Algebra by Dr.S. Arumugam and A. Thangapandi Issac, Scitech Publications, Chennai.

**Reference Book:**

- Linear Algebra by S.kumaresa, Prentice publications.
(For those who joined in June 2013 and after)

<table>
<thead>
<tr>
<th>PART – III : Core Subject</th>
<th>Subject Code: 05CT62</th>
<th>Hours per week: 6</th>
<th>Credit: 5</th>
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<tbody>
<tr>
<td>Subject Title: Complex Analysis</td>
<td>Sessional Marks: 25</td>
<td>Summative Marks: 75</td>
<td>Total Marks: 100</td>
</tr>
</tbody>
</table>

Objectives:

- To develop the skill of understanding definitions and theorems.
- To develop the skill in solving problems.

Unit I:

Elementary transformations – bilinear transformations – cross ratio – fixed points of a bilinear transformation – bilinear transformations which map the real axis onto itself, unit circle onto itself, real axis onto the unit circle.

Unit II:


Unit III:


Unit IV:


Unit V:


Text Book:

- Complex Analysis by Dr.S.Arumugam, A. Thangapandi Issac and A.Somasundaram. Scitech Publication, Chennai.

Reference Books:

- Complex Analysis by Dr.T.K.Manickavachagampillay, S.Viswanathan pritners and publishers Pvt Ltd.
- Complex Analysis by Dr. Durai pandian and others. Emerald Publishers, Chennai.
B.Sc. Mathematics CBCS Syllabus - SEMESTER – VI: Paper - II
(For those who joined in June 2014 and after)

<table>
<thead>
<tr>
<th>PART – III : Elective Subject</th>
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</thead>
<tbody>
<tr>
<td>Subject Title : Graph Theory</td>
<td></td>
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</tbody>
</table>

Subject Code: 05EP61  Hours per week: 5  Credit: 5
Sessional Marks: 25  Summative Marks: 75  Total Marks: 100

Objective:
- To develop the skill of understanding the definitions, the theorems and skill of solving problems.


Unit V: Colourability – chromatic number and chromatic index – five colour theorem – four colour problem – chromatic polynomials.

Text Book:
- An invitation to Graph Theory by Dr. S. Arumugam & S. Ramachandran, Scitech Publishing Company, Chennai.

Reference Book:
- Graph Theory by Frank Harary, Publisher, Addison – Wesley Publishing Company, New Delhi.
B.Sc. Mathematics CBCS Syllabus - SEMESTER – VI
(For those who joined in June 2014 and After)

<table>
<thead>
<tr>
<th>PART – III : Elective Subject</th>
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<tbody>
<tr>
<td><strong>Subject</strong></td>
</tr>
<tr>
<td>Subject code: 05EP62</td>
</tr>
<tr>
<td>Sessional Marks: 25</td>
</tr>
</tbody>
</table>

**Objective:**

- To develop the skill of forming OR models and the skill of solving problems.

**Unit – I:**

Inventory control – cost associated with inventories – factors affecting inventory control – Economic Order Quantity (EOQ) – deterministic inventory problems with no shortages – probabilistic inventory problems.

**Unit – II:**

Queuing theory – elements of queuing system and characteristics of queuing system – probability distribution in queuing systems – classification of queuing models – Poisson queuing systems (M / M / 1) : (∞ / FIFO), (M / M / 1) : (N / FIFO)

**Unit – III:**

Network scheduling by PERT/CPM – network and basic components – logical sequence – rules of network construction – numbering the events – critical path analysis – probability consideration in PERT – distinction between PERT and CPM.

**Unit – IV:**

Sequencing problems – problem of sequencing – basic terms used in sequencing – processing n jobs through two machines – processing n jobs through k machines – processing two jobs through k machines

**Unit – V:**

Replacement problem and system reliability – replacement of equipment/asset that deteriorates gradually – replacement policy when the value of money does not change with time – replacement policy when value of money changes with time.

**Text Book:**


**Reference Book:**

Objective:

❖ To develop the skill of solving problems

Unit – I: Attributes – definition – positive and negative classes – class frequencies – dichotomization

Unit – II: Consistency of data – association of attributes.

Unit – III: Analysis of variance (ANOVA) – introduction – one way classification.

Unit – IV: Two way classification.

Unit – V: Randomized block design and latin square design.

Text Book:
✓ Statistics by Dr. S. Arumugam, New Gamma Publishing House.

Reference Book:
✓ Mathematical Statistics by Kapur and Gupta.
Objective:

- To develop the skill in solving problem.

Unit – I:

Relations reflexive, symmetric, transitive and equivalence relations – antisymmetric relations – partial order relations – posets – linearly ordered sets – chain.

Unit – II:

Representation of a finite posets by diagrams – diagrams for M_5 and N_5 – zero and unit elements in a poset – greatest lower bound and least upper bound.

Unit – III:


Unit – IV:


Unit – V:

Definition of a Boolean algebra B (+, *, ', 0, 1) – Boolean algebra of bits – subalgebra – principles of duality – bounded and involution laws – diagrams for D_{70} and D_{210} – atoms – representation theorem.

Text Books:

- Modern Algebra by Dr. S.Arumugam and others.
- Discrete Mathematics by Seymour Lipschutz, Mark Lipson, Schaum series

Reference Book:

PART – IV : Skill Based Subject

Subject Title: MS OFFICE PRACTICAL

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Hours per week</th>
<th>Credit</th>
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<tbody>
<tr>
<td>05SB63</td>
<td>2</td>
<td>2</td>
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<table>
<thead>
<tr>
<th>Sessional Marks</th>
<th>Summative Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>75</td>
<td>100</td>
</tr>
</tbody>
</table>

Objective:

❖ To develop the skill of MS Office practical.

UNIT – I MS-Word – Text manipulation (Bio-Data) – Page formatting (Borders, Background etc.)

UNIT –II MS-Word – Working with tables – Working with graphics – Mail merge

UNIT –III MS-Excel – Formatting worksheet – Preparing students mark statement

UNIT –IV MS-Excel – Preparing employees salary – Creating chart

UNIT – V MS –Powerpoint – Creating simple presentation – Custom animation. (Text animation, Picture animation)

Text Book

SEMESTER – VI
(For those who joined in June 2013 and after)

<table>
<thead>
<tr>
<th>PART – IV: Common Subject Theory</th>
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<tbody>
<tr>
<td>Subject Title: Value Education</td>
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<tr>
<td>Subject Code: VEU61</td>
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<tr>
<td>Hours per week: 2</td>
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<td>Sessional Marks: 25</td>
</tr>
<tr>
<td>Summative Marks: 75</td>
</tr>
<tr>
<td>Total Marks: 100</td>
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</tbody>
</table>

UNIT I: The heart of Education:

UNIT II: The Value of Body and Life Energy

UNIT III: Analysis of Thought

UNIT IV: Moralisation of Derive

UNIT V: Eradication of Worries

Text Book: Value Education for Health, Happiness and Harmony
(Based on the Philosophy and Teachings of Swami Vethanthiri Maharishi)
Published By: Brain Trust, Aliyar A Wing of World Community Service Centre.
UNIT-I: Community Development–I:
Definition – structure and composition – community based issues – need for awareness – Developmental Programmes.

UNIT – II: Community Development–II:

UNIT – III: Volunteer Empowerment:

UNIT – IV: Social Analysis:

UNIT – V: Introduction to NSS:

(OR)


Reference:
✓ National Service Scheme Manual (Revised), Ministry of Human Resources Development, government of India.
Part – III : Allied Subject Theory

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Hours per week</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>05AT01</td>
<td>6</td>
<td>5</td>
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</tbody>
</table>

**Objective**

- To develop the skill of solving problems.

**Unit – I:**

Trigonometry – expression for \( \sin n\theta \), \( \cos n\theta \) and \( \tan n\theta \) – expression for \( \sin^n \theta \) and \( \cos^n \theta \) – expansion of \( \sin \theta \), \( \cos \theta \) and \( \tan \theta \) as a series in ascending powers of \( \theta \) – hyperbolic functions and inverse hyperbolic functions.

**Unit – II:**

Differential calculus – differentiation methods – successive differentiation (up to second order derivative only, omit Leibnitz theorem).

**Unit – III:**

Integral calculus – properties of definite integrals – reduction formula for \( \int \sin^n x \, dx \), \( \int \cos^n x \, dx \) and \( \int \sin^m x \cos^n x \, dx \) only – double and triple integrals (simple problems).

**Unit IV:**


**Unit V:**

Line and surface integrals – Green’s theorem, Stoke’s theorem and Gauss’ divergence theorem (statements only) – verifications (simple problems).

**Text book:**

- Ancillary Mathematics by Dr.S.Arumugam & Issac. Vol I – IV (Relevant Chapters), New Gamma Publishing House, Palayamkottai

**Reference:**

B.Sc. Physics & Chemistry Allied Mathematics CBCS Syllabus -SEMESTER - IV
(For those who joined in June 2013 and After)

<table>
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<th>PART – III : Allied Subject Theory</th>
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<tbody>
<tr>
<td>Subject Title : MATHEMATICS - II</td>
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<tr>
<td>Subject Code: 05AT02</td>
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<td>Sessional Marks: 25</td>
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</table>

Objective:

- To develop the skill of Knowledge in Mathematics and Solving problems

UNIT I:


UNIT II:

Second order linear differential equations with constant coefficients – methods of finding particular integrals for the funtions of the type e^{ax}, \cos ax, \sin ax, x^{m}, e^{ax}V – second order linear differential equations with variable coefficients.

UNIT III:


UNIT IV:


UNIT V:

Fourier series – Fourier series for even and odd funtions – half range Fourier cosine and sine series.

Text Book:

- Ancillary Mathematics by Dr.S.Arumugam & Issac. Vol I – IV (Relevant Chapters ), New Gamma Publishing House, Palayamkottai

Reference Book:

DEPARTMENT OF MATHEMATICS
CERTIFICATE COURSE IN COMPETITIVE MATHEMATICS

Unit – I:
HCF and LCM of numbers – decimal fractions.

Unit – II:
Square roots and cube roots – averages.

Unit – III:
Problems on ages – percentage.

Unit – IV:
Profit and loss – ratio and proportion.

Unit – V:
Partnership

Text Book:

Reference Book:

***************
DEPARTMENT OF MATHEMATICS
CERTIFICATE COURSE IN QUANTITATIVE APTITUDE

Unit – I:
Time and work – time and distance

Unit – II:
Problems on trains

Unit – III:
Simple interest – compound interest

Unit – IV:
Logarithms – calendar

Unit – V:
Clocks – stocks and shares

Text Book:

Reference Book:
✓ Quantitative Aptitude by Dr.R.S.Agarwal S.Chand& Company Ltd. 2010 edition.