

VIVEKANANDA COLLEGE

College with Potential for Excellence

(Residential & Autonomous – 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 Chidhbhavanandhaji 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 curriculum 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 stakeholders 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 obligations. 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 students 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)
FIRST SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT11	Tamil: Ikkalak Kavithaiyum Urainadaium	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental Grammar & History of Sanskrit Literature – I					
II	English	P2LE11	Communicative English Spoken English – I	5 1	2	25	75	100
III	Core	05CT11	Algebra and Trigonometry	5	4	25	75	100
	Core	05CT12	Differential Calculus	5	4	25	75	100
	Allied	06AT01	Physics-I	6	4	25	75	100
IV	Non Major	05NE11	Fundamentals of Mathematics	2	2	25	75	100
			TOTAL	30	19			

SECOND SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT21	Tamil: Ikala Ilakkiyamum Makkal Thagavaliyalum.	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature – II					
II	English	P2LE21	Functional English	5	2	25	75	100
	English	P2LE22	Spoken English-I	1	1	100	–	100
III	Core	05CT21	Integral Calculus	5	4	25	75	100
	Core	05CT22	Analytical Geometry 3D and Vector Calculus	5	4	25	75	100
	Allied	06AT02	Physics – II	4	4	25	75	100
	Allied	06AP03	Practical – I	2	2	40	60	100
IV	Non Major	05NE21	Statistics and Operations Research	2	2	25	75	100
			TOTAL	30	22			

THIRD SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT31	Kappiyamum Pakthi Ilakkiyamum Nadakamum	6	3	25	75	100
	Sanskrit	P1LS31	Prose, Poetics & History of Sanskrit Literature-II					
II	English	P2LE31	English through Drama & Poetry Spoken English – II	4 1	2	25	75	100
III	Core	05CT31	Differential Equations	5	4	25	75	100
	Core	05CT32	Numerical methods	6	5	25	75	100
	Allied	05AT31	Programming in C	4	3	25	75	100
	Allied	05AP32	Practical: Programming in C	2	2	40	60	100
IV	Skill Based	05SB31	Mathematical Logic	2	2	40	60	100
TOTAL				30	21			

FOURTH SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT41	Sanga Ilakkiyamum Neethi Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS41	Drama and History of Sanskrit Literature – IV					
II	English	P2LE41	English through classiscs	4	2	25	75	100
	English	P2LE42	Spoken English – II	1	1	100	--	100
III	Core	05CT41	Sequence and Series	6	5	25	75	100
	Core	05CT42	Dynamics	5	4	25	75	100
	Allied	05AT41	Programming in C++	3	3	25	75	100
	Allied	05AP42	Practical : Programming in C++	3	2	40	60	100
IV	Skilled based	05SB41	Competitive mathematics	2	2	25	75	100
Total				30	22			

FIFTH SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
II	English	P2LE51	English for Carrier Development	1	1	100	--	100
III	Core	05CT51	Statistics	5	4	25	75	100
	Core	05CT52	Modern Algebra	5	4	25	75	100
	Core	05CT53	Real Analysis	5	5	25	75	100
	Core	05CT54	Statics	5	4	25	75	100
	Elective	05EP51	Linear Programming	5	5	25	75	100
IV	Skill Based	05SB51	Quantitative Aptitude	2	2	25	75	100
	E.S	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	30	27			

SIXTH SEMESTER

Part	Study Component	Subject Code	Title of The Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
II	English	P2LE61	English for Professional Excellence	1	1	100		100
III	Core	05CT61	Linear Algebra	5	4	25	75	100
	Core	05CT62	Complex Analysis	6	5	25	75	100
	Elective	05EP61	Graph Theory	5	5	25	75	100
	Elective	05EP62	Operations Research	6	5	25	75	100
IV	Skill Based	05SB61	Applied Statistics	2	2	25	75	100
	Skill Based	05SB62	Boolean Algebra	2	2	40	60	100
	Skill Based	05SB63	MS Office Practical	2	2	25	75	100
	VE	VEUG61	Value Education	2	2	25	75	100
	EA		Extension Activities		1	--	100	100
			TOTAL	30	29			
			TOTAL HOURS	180				
			TOTAL CREDITS		140			

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DEPARTMENT OF METHEMATICS

CBCS - DISTRIBUTION OF CREDIT

B.Sc. Mathematics

(For those who joined in June 2013 and after)

Study Component	SEMESTER						Total Credit
	I	II	III	IV	V	VI	
Tamil / Sanskrit	3	3	3	3	-	-	12
English	2	2+1	2	2+1	1	1	12
Core Subject	8	8	9	9	17	9	60
Allied Subject	4	6	5	5	-	-	20
Non Major Elective	2	2	-	-	-	-	4
Skill Based Subject	-	-	2	2	2	6	12
Elective Subject	-	-	-	-	5	10	15
Environmental Study	-	-	-	-	2	-	2
Value Education	-	-	-	-	-	2	2
Extension Activity	-	-	-	-	-	1	1
TOTAL	19	22	21	22	27	29	140

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		
Subject Title : Algebra and Trigonometry		
Subject code: 05CT11	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *To develop the skill in basic Mathematics.*

Algebra

Unit – I:

Imaginary roots, irrational roots – relation between roots and coefficients – symmetric functions of the roots – sum of powers of the roots - Newton's theorem – transformations of equations - roots with signs changed - roots multiplied by a given number.

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:

Expansions – expansions of $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$ – expressions for $\cos^n\theta$ and $\sin^n\theta$ – expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in series of ascending powers of θ – hyperbolic functions – inverse hyperbolic functions.

Unit – V:

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

Text book:

- ✓ Algebra vol I by T.K.Manicavachagampillai, Viswanathan, printers and publishers Pvt. Ltd., Chennai. For units I, II, III-relevant chapters.
- ✓ Trigonometry by T.K.Manicavachagampillai, Viswanathan, printers and publishers Pvt. Ltd., Chennai. For units IV, V - relevant 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.

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

PART – III : Core Subject Theory		
Subject Title : Differential Calculus		
Subject Code: 05CT12	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

- ❖ *To develop the skill in Solving problems*

Unit-I:

Methods of differentiation: standard forms – differential coefficient of x^n , e^x , $\log x$, $\sin x$, $\cos x$, $\tan x$, (derivations not included) – differential coefficient of a sum or difference – product rule – quotient rule – function of a function rule – inverse functions – hyperbolic functions – inverse hyperbolic functions – logarithmic differentiation – trigonometrical transformations – differentiation of implicit function – differentiation of one function w.r.t. another function.

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:

Subtangent and subnormal – differential coefficient of the length of an arc of a curve – polar coordinates – angle between the radius vector and the tangent – angle of intersection of two curves – length of an arc in polar co-ordinates – envelope – method of finding the envelopes.

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:

Partial differentiation – function of a function rule – total differential coefficient – implicit functions – homogeneous functions.

Text Book:

- ✓ Calculus vol I by T.K.Manikavasakampillai and S. Narayanan, Vishwanathan printers and publishers Pvt. Ltd., Chennai.

Reference Book:

- ✓ Calculus by Dr. S.Arumugam, New Gamma publishing house, Palayamkottai.

B.Sc. Mathematics CBCS Syllabus - **SEMESTER – I**
(For those who joined in June 2014 and After)

PART – IV : Non Major Elective		
Subject Title : Fundamentals of Mathematics		
Subject Code: 05NE11	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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.

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

PART – III : Core Subject Theory		
Subject Title : Integral Calculus		
Subject Code: 05CT21	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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 $x^n e^{ax}$, $x^n \cos ax$, $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\operatorname{cosec}^n x$.

Unit – III

Double Integral – evaluation of double integral – double integral in polar coordinates – Beta and Gamma functions.

Unit –IV

Triple integrals – change of variables – Jacobian – transformation from cartesian to polar coordinates – cartesian to spherical polar coordinates – cartesian to cylindrical coordinates – area by double integral – volume by triple integral.

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:

- ✓ Calculus Vol II and III by S. Narayanan, T.K. Manicavachagompillay. S.Visvanathan, printers & publishers, Pvt. Ltd Chennai.

Reference Book:

- ✓ Calculus by Dr.S.Arumugam New Gamma Publishing House, Palayamkottai.

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

PART – III : Core Subject Theory		
Subject Title : Analytical Geometry (3D) and Vector Calculus		
Subject Code: 05CT22	Hours per week: 5	Credit: 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 – IV Vector differentiation – differentiation of vectors – gradient of a vector – geometrical interpretation – directional derivative and its maximum value – divergence and curl of a vector – solenoidal and irrotational vectors – Laplacian operator – harmonic vectors – connected theorems and problems.

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:

- ✓ Analytical Geometry 3 Dimensions and Vector Calculus by T.K.Manicavachagompillai. S.Vishwanathan printers and publishers Pvt. Ltd. Chennai.

Reference book:

- ✓ Analytical Geometry 3D and Vector Calculus by S.Arumugam and Thangapandian Isaac. New Gamma Publications Company, Palayamkottai.

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

PART – IV : Non Major Elective		
Subject Title : Statistics and Operations Research		
Subject Code: 05NE21	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

- ✓ Statistics by Dr.S.Arumugam, New Gamma publications Palayamkottai, edition 2013.
- ✓ Operations Research by Dr.S.Arumugam. Scitech Publications, Chennai, edition 2006.

Reference Books:

- ✓ Statistics, by S.C.Guptha and V.K.Kapur Sultan Chand & sons, New Delhi.
- ✓ Operations Research, by Kanti Swarop P.K.Guptha and Manmohan 5th edition 2005.

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

Part – III : Core Subject Theory		
Subject Title : Differential Equations		
Sub. Code: 05CT31	Hours per week: 5	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

5 Hours / Week)

Objective:

- ❖ *To develop the skill in solving differential equations.*

UNIT I

Differential equations of first order – formation of differential equations – homogeneous equations – non homogeneous equations – linear equations – Bernoullis equations – exact equations.

UNIT II

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

UNIT III

Variation of parameters – simultaneous differential equations – simultaneous equations with constant coefficients – total differential equations.

UNIT IV

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

UNIT V

Partial differential equations – derivation of partial differential equations – different integrals of partial differential equations – solutions of partial differential equations in some simple cases – standard types of partial differential equations – standard I, II, III, IV – Lagrange's equations.

Text Book:

- ✓ Calculus –vol III, by S. Narayanan, T.K.Manicavachagam Pillay, S.Viswanathan (printers & publishers) Pvt Ltd.

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)

Part – III : Core Subject Theory		
Subject Title : Numerical Methods		
Sub. Code: 05CT32	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *To develop the skill of solving problems.*

UNIT I

Algebraic and transcendental equations: errors in numerical computation- iteration method – Aitken’s Δ^2 method – bisection method –Regula falsi method – Newton-Raphson method – simultaneous equations – back substitutions – Gauss’ elimination method – Gauss-Jordan elimination method – calculation of inverse of a matrix – Gauss-Jacobi iteration method – Gauss-Seidal iteration method.

UNIT II

Finite differences and interpolation – difference operators – other difference operators – difference equations – formation of difference equations – linear difference equations – Newton’s interpolation formula – central difference interpolation formula – Lagrange’s interpolation formula – divided differences – divided difference interpolation formula – inverse interpolation.

UNIT-III

Numerical differentiation – derivatives using Newton’s forward, backward and central difference interpolation formulae – Stirling’s formula – maxima and minima of the interpolating polynomial.

UNIT-IV

Numerical integration – Newton-Cote’s quadrature formula – trapezoidal rule – Simpson’s one-third rule – Simpson’s three-eighth rule – Weddley’s rule.

UNIT-V

Numerical solution of differential equations – Taylor’s series method – Picard’s method – Euler’s method – Runge-Kutta methods – predictor-corrector formulae.

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)

Part – III : Allied Subject Theory		
Subject Title : Programming in C		
Sub. Code: 05AT31	Hours per week: 4	Credit:3
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objectives:

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

UNIT I:

Character set – C tokens – keywords and identifiers – constants – variables – data types – declaration of variables – assigning values to variables – defining symbolic constants – operators – arithmetic, relational and logical operators – assignment – increment, decrement and conditional operators – arithmetic expressions – type conversions – managing input/output operations.

UNIT II:

Decision making and branching – ‘If’ statement (all forms) – ‘switch’ statement – ‘goto’ statement – loops – ‘while’, ‘do’, ‘for’ statements – jumps in loops.

UNIT III:

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

UNIT IV:

User defined functions – categories of functions – handling non-integer functions – functions with arrays – structures and unions – structure initialization – comparison of structure variables – arrays of structures – arrays within structures – structures within structures – structures and functions – unions.

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:

- ✓ Programming in ANSI C by E.Balagurusamy, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

Reference Book:

- ✓ Schaum’s Outline Series Programming with C by Byron Gottfried (Second Edition), Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

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

PART – III : Allied Subject Practical		
Subject Title : Practical: Programming in C		
Subject Code: 05AP32	Hours per week: 2	Credit: 2
Sessional Marks: 40	Summative Marks: 60	Total Marks: 100

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 $(1+2+3+\dots+n)$
9. Program to sum the series $(1/1+1/2+1/3+\dots+1/n)$
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)

Part – IV : Skill Based Subject		
Subject Title : Mathematical Logic		
Sub. Code: 05SB31	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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)

Part – III : Core Subject Theory		
Subject Title : Sequences and Series		
Sub. Code: 05CT41	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *To develop the skill of solving problems.*

UNIT I:

Intervals in \mathbb{R} – bounded sets – least upper bound and greatest lower bound of sets – bounded functions – triangle inequalities – arithmetic, geometric and harmonic means – Cauchy-Schwarz inequality – Weierstrass’ inequality – theorems only (no problems).

UNIT II:

Sequences – bounded, monotonic, convergent, oscillatory, divergent sequences – algebra of limits – behaviour of monotonic sequences.

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:

Alternating series – absolute convergence and conditional convergence – Dirichlet test – rearrangement of series – multiplication of series – power series.

Text Book:

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

Reference Book:

- ✓ Algebra by T.K.Manicavachagom pillay, T. Natarajan, K.S. Ganapathy, S.Viswanathan (Printers & Publishers) Pvt Ltd, Chennai.

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

Part – III : Core Subject Theory		
Subject Title : Dynamics		
Sub. Code: 05CT42	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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

Collision of elastic bodies – fundamental laws of impact – impact of a smooth sphere on a fixed smooth plane – direct impact of two smooth spheres – oblique impact of two smooth spheres – loss of kinetic energy due to direct and oblique impact of two smooth spheres.

Unit – III

Simple Harmonic Motion – solution of S.H.M equation – geometrical representation of S.H.M – composition of two simple harmonic motions. simple pendulum – equivalent simple pendulum – seconds pendulum.

Unit – IV

Central orbits – velocity and acceleration in polar coordinates – differential equation of central orbits – pedal equation of central orbits – pedal equations of some well known curves – velocities in central orbits.

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:

- ✓ Mechanics by P. Duraipandian, Laxmi Duraipandian, S. Chand and company Pvt. Ltd., New Delhi.

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

Part – III : Allied Part – III- Allied Subject Theory		
Subject Title : PROGRAMMING IN C++		
Sub. Code: 05AT41	Hours per week: 3	Credit: 3
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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++

Unit II: Functions in C++ – the main function – function prototyping – call by reference – return by reference – inline functions – default arguments – constant arguments – function overloading – friend and virtual functions – math library functions.

Unit III: Classes and Objects – specifying a class – defining member functions – static data members – static member functions – array of objects – friendly functions – returning objects.

Unit IV: Constructors and Destructors – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – dynamic initialisation of objects – copy constructor – dynamic constructors – constructing two-dimensional arrays – constant objects – destructors – operator overloading.

Unit V: Inheritance – defining derived classes – single inheritance – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance – virtual base classes – abstract classes – constructors in derived classes.

Text Book:

- ✓ Object Oriented Programming with C++ by E. Balagurusamy Fourth Edition
Tata McGraw Hill Publishing Company Limited, New Delhi.

Reference Book:

- ✓ The Complete Reference in C++ Tata McGraw Hill Publishing Company
Limited, New Delhi.

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

PART – III : Allied Subject Practical		
Subject Title : Practical: Programming in C		
Subject Code: 05AP32	Hours per week: 2	Credit: 2
Sessional Marks: 40	Summative Marks: 60	Total Marks: 100

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)

Skill Based Subject		
Subject Title : Competitive Mathematics		
Sub. Code: 05SB41	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

- ✓ Quantitative Aptitude, by Dr.R.S.Aggarwal, S Chand & Company Pvt. Ltd., 2010 Edition.

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

PART – III : Core Subject Theory		
Subject Title : STATISTICS		
Subject Code: 05CT51	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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 II: Probability and random variables – probability set function – addition theorem on probability – conditional probability – independent events – Boole’s inequality – random variables – discrete and continuous random variables – mathematical expectation – moment generating functions – characteristic functions.

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 χ^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:

- ✓ Mathematical Statistics by J.N. Kapur and H.S. Saxena, S.Chand & Company Pvt. Ltd, New Delhi.

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

PART – III : Core Subject Theory		
Subject Title : Modern Algebra		
Subject Code: 05CT52	Hours per week: 5	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

Rings – definition – elementary properties – isomorphism – types of rings – characteristics of a ring – sub rings and ideals – quotient rings – maximal and prime ideals.

Text Book:

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

Reference Book:

- ✓ Modern Algebra by M.L. Santiago, Tata McGraw Hill publishing Company Pvt. Ltd., New Delhi.

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

PART – III : Core Subject Theory		
Subject Title : REAL ANALYSIS		
Subject Code: 05CT53	Hours per week: 5	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *To develop the skill of understanding definitions and theorems.*

UNIT I:

Countable sets – uncountable sets – inequalities of Holder and Minkowski.
metric spaces – definition and examples – bounded sets in a metric space – open ball
in a metric space – open sets.

UNIT II:

Sub spaces – interior of a set – closed sets – closure – limit point – dense sets.

UNIT III:

Complete metric space – Baire's category theorem – continuity –
homeomorphism – uniform continuity – discontinuous functions on \mathbb{R} .

UNIT IV:

Connectedness – definition and examples – connected subsets of \mathbb{R} –
connectedness and continuity.

UNIT V:

Compactness – compact space – compact subsets of \mathbb{R} – equivalent
characterization for compactness – compactness and continuity.

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)

Part – III : Core Subject Theory		
Subject Title : STATICS		
Subject Code: 05CT54	Hours per week: 5	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *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:

Parallel forces and moments – resultant of two like and unlike parallel forces – conditions of equilibrium of three coplanar parallel forces – moment of a force – geometrical representation of moment – Varignon’s theorem – generalized theorem – moment of a force about an axis – couple – equilibrium of two couples – equivalence of two couples – couples in parallel planes – resultant of coplanar couples – resultant of a couple and a force.

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:

Friction – statical, dynamical and limiting friction – laws of friction – co-efficient of friction – angle of friction – cone of friction – equilibrium of a particle on a rough inclined plane – equilibrium of a body on a rough inclined plane under a force parallel to the plane – equilibrium of a body on a rough inclined plane under any force.

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.

Ltd., New Delhi.

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

PART – III : Elective Subject		
Subject Title : LINEAR PROGRAMMING		
Subject Code: 05EP51	Hours per week: 5	Credit: 5
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:

LPP-simplex method – fundamental properties of solutions – the computational procedure – use of artificial variables – two phase method – penalty (Big-M) method.

UNIT III:

Duality in linear programming – general primal-dual pair – formulating dual problem – primal-dual pair in matrix form – duality and simplex method.

UNIT IV:

Transportation problem (TP) – general transportation problem – the transportation table – duality in transportation table – loops in transportation tables – formulation of the TP – solution of a TP – north west corner method – least cost method – Vogel’s approximation method – degeneracy in TP – transportation algorithm (modi method) - unbalanced TP.

UNIT V:

Assignment problem – mathematical formulation of the problem – the assignment method – special cases in assignment problems – games and strategies – two person zero-sum games – some basic terms – the maxmin, minmax principle – saddle points – graphic solution – dominance property – linear programming method.

Text Book:

- ✓ Operations Research by Kanti Swarup, P.K.Gupta, Man Mohan. Publisher: Sultan Chand & sons company Pvt. Ltd., New Delhi.

Reference book:

- ✓ Operations Research by J.K.Sharma, Macmillan Publication India Pvt. Ltd., New Delhi.

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

PART – III : Skill Based Subject		
Subject Title : Quantitative Aptitude		
Subject Code:05SB51	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

- ✓ Quantitative Aptitude for competitive examinations by Dr. R.S.Aggarwal, Tata McGraw Hill publication, New Delhi, 2004 Edition.

Reference Book:

- ✓ Quantitative Aptitude by Dr. R.S.Aggarwal, S. Chand & Company Pvt. Ltd., 2010 Edition.

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

Part – IV : Common Subject Theory		
Subject Title : Environmental studies		
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

Environmental pollution – Air pollution- causes and effect – Ozone depletion –
Global warming – acid rain – Water pollution – Noise pollution – Solid waste
management – Nuclear hazard

Unit-V: 4hrs

Human population and the environment – Population growth – variation among
nations – effects of population explosion – family welfare programme – environment
and human health.

Text books

- ✓ Environment studies by R.Murugesan, 2009 edition, Milleneum Publication.,
Madurai-16.

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

PART – III : Core Subject Theory		
Subject Title : Linear Algebra		
Subject Code: 05CT61	Hours per week: 5	Credit: 4
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

❖ *To develop the skill of solving problems.*

Unit-I: Vector spaces – definition and examples – subspaces – linear transformation – span of a set – linear independence – basis and dimension – rank and nullity.

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

Unit – III: Theory of matrices – algebra of matrices – types of matrices – the inverse of a matrix – elementary transformations – rank of a matrix.

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.

B.Sc. Mathematics CBCS Syllabus - SEMESTER – VI: Paper - III
(For those who joined in June 2013 and after)

PART – III : Core Subject		
Subject Title : Complex Analysis		
Subject Code: 05CT62	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

Cauchy Riemann equations – complex form of C.R. equations – C.R. equations in polar co-ordinates – analytic functions – harmonic functions – Laplace equation – finding conjugate harmonic of an analytic function – Milne-Thompson method.

Unit III:

Complex integration – definite integral – length of a curve – Cauchy’s theorem – simply connected and multiply connected regions – Cauchy’s integral formula – maximum modulus theorem – higher derivatives – derivative of an analytic function is analytic – Cauchy’s inequality – Liouville’s theorem – fundamental theorem of algebra – Morera’s theorem.

Unit IV:

Series expansions – Taylor’s theorem – Taylor’s series – Maclaurin’s series – Laurent’s theorem – Laurent’s series – zeros of an analytic function – order of a zero – singular points – isolated singularity – removable singularity – poles – order of a pole – simple pole – double pole – essential singularities.

Unit V:

Calculus of residues – residues – Cauchy’s residue theorem – argument theorem – Rouché’s theorem – fundamental theorem of algebra – evaluation of definite integrals – contour integration (problems only).

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 printers 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)

PART – III : Elective Subject		
Subject Title : Graph Theory		
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 I: Graphs and subgraphs – definition and examples – degrees – sub graphs – isomorphism between graphs – Ramsey numbers – independent sets and coverings – intersection graphs and line graphs – matrix of a graph – operations on graphs.

Unit II: Degree sequences – graphic sequences – connectedness – walks, trails and paths – connectedness and components – blocks – connectivity.

Unit III: Eulerian graphs – Hamiltonian graphs – trees – characterization of trees – centre of a tree.

Unit IV: Matchings – matchings in bipartite graphs – planarity – definition and properties – characterization of planar graphs – thickness, crossings and outer planarity.

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)

PART – III : Elective Subject		
Subject Title : Operations Research		
Subject ode: 05EP62	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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 $(M / M / 1) : (\infty / \text{FIFO})$, $(M / M / 1) : (N / \text{FIFO})$

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:

- ✓ Operations Research by Kanti Swarup, P.Kapur, Gupta and Man Mohan, Sultan Chand & Sons Publishers, New Delhi.

Reference Book:

- ✓ Operations Research by J.K. Sharma, Mac Millan publishers, New Delhi.

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

PART – IV : Skill Based Subject		
Subject Title : Applied Statistics		
Subject Code: 05SB61	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks:100

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.

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

PART – IV: Skill Based Subject		
Subject Title : Boolean Algebra		
Subject Code: 05SB62	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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:

Lattice – definition and examples – Idempotent, commutative, associative and absorption laws – sublattices – distributive lattices – modular lattices.

Unit – IV:

Complemented lattices – Boolean algebra – De Morgan's laws – homomorphisms – kernel of a homomorphism – isomorphisms – ideal of a Boolean algebra.

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:

- ✓ Discrete Mathematics by N.CH. S.N. Iyengar, V.M. Chandrasekar, K.A.Venkatesh, P.S.Arunachalam, Vikas publishing Home P.Ltd.

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

PART – IV : Skill Based Subject		
Subject Title : MS OFFICE PRACTICAL		
Subject Code: 05SB63	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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

- ✓ P.C. Software by R.K. Taxali.

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

PART – IV : Common Subject Theory		
Subject Title : Value Education		
Subject Code: VEUG61	Hours per week: 2	Credit: 2
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

UNIT I: The heart of Education:

Introduction – Eternal Value – Integrated approach to value education - one for all and all for one – Responsibilities of a citizen – Habit Vs wisdom – purifying mind pollution – Respect for all Religions – Parents, teachers and fellow students – The need and benefit of exercise and meditation for students.

UNIT II: The Value of Body and Life Energy

Introduction – what are the causes for pain, Disease and death? Three Basic needs for all living Beings – Personal Hygiene Five Factors of Balance in Life – The need and benefits of physical Exercise – The value and Base of Life energy – The value and Base of Bio-magnetism - You are your own best caretaker. The Marvelous nature of mind Introduction- Bio-magnetism – The base of the mind – characterisation of the Genetic Centre – mental frequency – practice for a creative mind - benefits of meditation.

UNIT III: Analysis of Thought

Introduction – An Exposition on the nature of thought– six roots for thoughts – Introspection for analysis of thoughts-practical techniques for analysis of thoughts. Benefits of Blessings Effects of good vibrations – Make Blessing a Daily Habit.

UNIT IV: Moralisation of Desire

Introduction – moralization of desire - Analyse your desires – Summary of practice Neutralisation of Anger:Introduction – meaning – characteristics of Anger – Anger is a Destructive emotion – Anger spoils our relationship with others – Some common misconception about anger – will power and method success through awareness – method of neutralisation of anger.

UNIT V: Eradication of Worries

Worry is a mental disease – Nature’s Law of cause and effect – factors beyond our control – How to deal with problems – analyse your problem and eradicate worry –Harmonious Relationships Introduction – Three angles of life – The value of harmony in personal relations – Love and Compassion – pleasant face and loving words – appreciation and gratitude to parents and teachers – Bringing needed reforms in educational institutions – Why should we serve others? Brotherhood – A scientific Basis for Universal Brotherhood protection of the environment – non-violence and the five fold moral culture.

Text Book: Value Education for Health, Happiness and Harmony

(Based on the Philosophy and Teachings of Swami Vethanthiri Maharisi)

Published By: Brain Trust, Aliyar A Wing of World Community Service Centre.

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

PART – V : Common Subject Theory		
Subject Title : Extension Activities		
Subject Code: EAUG61	Hours per week:	Credit: 1
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

UNIT-I: Community Development–I:

Definition – structure and composition – community based issues – need for awareness – Developmental Programmes.

UNIT – II: Community Development–II:

Rural Scenario – need of the Community – need for the community service – role of youth in community building – communal harmony – literacy – Educational Recreation.

UNIT – III: Volunteer Empowerment:

Women’s Emancipation – formation of Youth Clubs – Self-Help Groups – Youth and Development.

UNIT – IV: Social Analysis:

Social issues – cultural invasion – media infiltration – human rights Education/Consumer Awareness – Adolescents Reproductive – HIV/AIDS/STD – Social harmony/National integration – Blood Donation.

UNIT – V: Introduction to NSS:

Basic Concepts – profile – aims – objectives – symbol – Motto – structure – Regular activities – Special Camping Programme – Adventure Programme – National Days and Celebrations.(Applicable to NSS Students)

(OR)

NCC - Origin – Organisation – Ministry of Defence – Armed forces – commands – Defence establishments in Tamil Nadu Civil Defence – Aid to civil authorities – Disaster management – Leadership – Man management – Adventure activities – Social service

Reference:

- ✓ National Service Scheme Manual (Revised), Ministry of Human Resources Development, government of India.

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

PART – III : Allied Subject Theory		
Subject Title : MATHEMATICS – I		
Subject Code: 05AT01	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

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 θ – 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:

Vector differentiation – differentiation of vectors – gradient of a vector – directional derivative and its maximum value – divergence and curl of a vector – solenoidal and irrotational vectors (simple problems only).

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:

- ✓ Ancillary Mathematics by T.K Manikavasagampillai & Others Viswanathan printers and publishers Pvt. Ltd., Chennai.

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

PART – III : Allied Subject Theory		
Subject Title : MATHEMATICS - II		
Subject Code: 05AT02	Hours per week: 6	Credit: 5
Sessional Marks: 25	Summative Marks: 75	Total Marks: 100

Objective:

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

UNIT I:

Formation of differential equation – differential equation of first order and first degree – variables separable, homogeneous and nonhomogeneous differential equations – linear equations.

UNIT II:

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

UNIT III:

Laplace transforms – inverse Laplace transforms – solution of differential equations using Laplace transforms.

UNIT IV:

Formation of partial differential equations – definition of complete, particular, singular and general integrals – solving first order partial differential equations.

UNIT V:

Fourier series – Fourier series for even and odd functions – 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:

- ✓ Ancillary Mathematics by T.K Manikavasagampillai & Others Viswanathan, printers and publishers Pvt Ltd. Chennai.

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:

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

Reference Book:

- ✓ Quantitative Aptitude, by Dr.R.S. Aggarwal, S.Chand& Company Pvt. Ltd., 2010 Edition.

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:

- ✓ Quantitative Aptitude for Competitive Examinations R.S.Aggarwal, Tata McGraw Hill Publisher, New Delhi 2004 edition.

Reference Book:

- ✓ Quantitative Aptitude by Dr.R.S.Aggarwal S.Chand& Company Ltd. 2010 edition.

