

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BA605	Compulsory	International Economics	5	-	-	5	60	20	20	-	-

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST Mid Semester Test.

Course Objectives:

1. To enable the students to learn the fundamental theories of international economics
2. To understand the international trade system and their implications for the national economy in modern days.

Course Outcomes:

1. Understand the various reasons why countries engage in international trade, including the direction and volume of trade between nations.
2. Understand how international factor mobility affects an economy.
3. Analyze current issues and policies using the concepts of international economy

Syllabus:

UNIT I: Introduction and Theories of International Trade

Meaning and Importance of International Economics; Distinction between Internal and International Trade; Theories of Absolute cost advantage and Comparative Cost; Heckscher-Ohlin model of trade; Leontief Paradox.

UNIT II: Trade and Commercial Policy

Terms of Trade: Various concepts of terms of trade; Factors Affecting and Deterioration in Terms of trade; Gains from Trade; Free Trade v/s Protectionist Policy-Relative Merits and Demerits; Tariffs and Quotas – meaning, types, effects. Concept of optimum tariff; Offer curves.

UNIT III: Balance of Payment

Concepts and components of balance of trade and balance of payments-Consequences of disequilibrium and various measures to correct deficit in the balance of payments; Devaluation-Merits and Demerits.

UNIT IV : India's Foreign Trade

Recent changes in the composition and direction of foreign trade; Causes and effects of persistent deficit in the balance of payments.

Unit-V: Foreign Investments

Foreign Capital- Role and sources of foreign capital, FDI; Multinational Corporations (MNC's)-Role of multinational corporations in India.

Reference Books:

1. Paul Krugman, Maurice Obstfeld, and Marc Melitz, *International Economics: Theory and Policy*, Addison-Wesley (Pearson Education Indian Edition), 9th edition, 2012.
2. Dominick Salvatore, *International Economics: Trade and Finance*, John Wiley International Student Edition, 10th edition, 2011.



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BSMA604	DC	Computer Science & Programming	3	1	0	4	60	20	20	0	0

Course Educational Objective:

- To introduce the students with the Fundamentals of the Computer Science & Programming.

Course Outcome: After the successful completion of this course students will be able to

- Understand and solve problems of the Boolean algebra.
- Write and execute program written in C programming language
- Design Algorithms and Flow Charts.

Syllabus:

UNIT – I

Boolean algebra – Basic Postulates and Definition. Two-element Boolean algebra. Boolean function. Truth table. Standard form of Boolean function – DNF and CNF. Minterms and maxterms. Principle of Duality. Some laws and theorem of Boolean algebra.

UNIT – II

Simplification of Boolean expressions – Algebraic method and Karnaugh Map method. Application of Boolean algebra– Switching Circuits, Circuit having some specified properties, Logical Gates– AND, NOT, OR, NAND, NOR etc.

UNIT – III

Computer Fundamentals: Historical Development, Computer Generations, Computer Anatomy – Different Components of a Computer System.

Number Systems: Binary to Decimal and Decimal to Binary. Binary Arithmetic. Octal and Hexadecimal systems. ASCII, EBCDIC and UNICODE. Concepts of bit, byte, word and nibble.

UNIT – IV



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

Introduction to C Programming: Algorithms, flowcharts, history, features, identifiers, input/output functions, control structures- if, for, do-while, while and switch-case, arrays.

UNIT – V

Library and user defined functions, recursion. String handling, pointers, structures. Basics of file handling in C.

Text Books:

1. Let us C – Y. Kanetkar (BPB Publications)
2. Programming in C – V. Krishnamoorthy and K. R. Radhakrishnan (Tata McGraw Hill).
3. C by example: Noel Kalicharan (Cambridge University Press).
4. Programming in ANSI C – E. Balagurusamy (Tata McGraw Hill).
5. Computer System Architecture by Morris Mano
6. Digital computer organization by Malvino and Leach.

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSST601	DC	SQC and Design of Experiments	60	20	20	50	-	4	1	3	8

Course Objective

To introduce the students with the Fundamentals of the SQC and Design of Experiment

Course Outcomes

After the successful completion of this course students will be able to:

- 1. know about the general theory of control charts.*
- 2. apply the techniques of Acceptance sampling plan.*
- 3. apply the techniques of the ANOVA.*
- 4. know the solution of the Factorial design.*

Course Content:

UNIT I

General theory of control charts causes of variation, process and product control, 3σ Control charts for variables: X-bar and R-charts. Criteria for detecting lack of control in X-bar and R-charts, Control charts for attributes, p, np and c-charts, applications of c-chart.

UNIT II

Acceptance sampling plan: Principle of acceptance sampling plans. Single and Double sampling plan their OC, AQL, LTPD, AOQ, AOQL, ASN, ATI functions with graphical interpretation, use and interpretation of Dodge and Romig's sampling inspection plan tables. Sequential sampling plan.

UNIT III

Analysis of Variance Definition of different terms, one-way classification and two-way classification with one observation per cell, two-way classification with m observations per cell (for fixed effect model). Analysis of covariance with one way classification

UNIT IV

Fundamental principles of design: Randomization, Replication and local control. Layout and analysis of completely randomized design (CRD) and randomized block design (RBD), Estimation and analysis of one and two missing observations in RBD, efficiency of RBD relative to CRD.

UNIT V

Layout and analysis of Latin Square design. Estimation and analysis of one missing observation in LSD. Efficiency of LSD relative to CRD and RBD, Factorial experiments: advantages of factorial experiments; 2^2 and 2^3 designs, main and interaction effects, contrast. Definition of confounding Complete and partial confounding.

SUGGESTED READING:

1. Duncan AJ. (1974) : Quality Control and Industrial Statistics, IV Edition, Tarnporewala and Sons.
2. Montgomery, D.C. (1991): Introduction to the Statistical Quality Control, IInd Edition, John Wiley and Sons.
3. S. C. Gupta & V. K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand & Co.
4. D.C. Montgomery: Design and Analysis of Experiments, John Wiley.
5. M. Mahajan; Statistical Quality Control, Dhanpat Rai and Co.

List of Practical:

1. Analysis of a CRD
2. Analysis of an
3. Analysis of an LSD
4. Analysis of an RBD with one missing observation
5. Analysis of an LSD with one missing observation.
6. Analysis of a partially confounded two level factorial design
7. Analysis of a single replicate of a 2^n design
8. Analysis of a fraction of 2^n factorial design.
9. Construction and interpretation of statistical control charts f
(i) X-bar & R-chart

- (ii) f $\bar{X}$ -bar & s-chart
- (iii) f np-chart
- (iv) f p-chart
- (v) f c-chart f

Single sample inspection plan: Construction and interpretation of OC, AQL, LTPD, ASN, ATI, AOQ, AOQL curves.

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			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 605(1) BSMA 605(2)	DC	Elective-II (1) A Course of Calculus (2) Discrete Mathematics	60	20	20	-	-	3	1	-	4

(1) A Course of Calculus

Course Objective

To introduce the students with the Fundamentals of the Advanced Calculus

Course Outcomes

After the successful completion of this course students will be able to:

- 1. understand and decide convergence and divergence of a series.*
- 2. know properties of the power series.*
- 3. solve higher order ordinary differential equations.*
- 4. apply Laplace Transform to find solution of the ODE.*
- 5. solve partial differential equations.*

Course Content:

UNIT – I

Concept of Point-wise and Uniform convergence of sequence of functions and series of functions with special reference of Power Series. Statement of Weierstrass M-Test for Uniform convergence of sequence of functions and of series of functions. Simple applications. Statement of important properties like boundedness, continuity, differentiability and integrability of the limit function of uniformly convergent sequence of functions and of the sum function of uniformly convergent series of functions. Determination of Radius of convergence of Power Series.

UNIT – II

Statement of properties of continuity of sum function power series. Term by term integration and Term by term differentiation of Power Series. Statements of Abel's Theorems on Power Series. Convergence of Power Series. Expansions of elementary functions such as e^x , $\sin x$, $\log(1+x)$, $(1+x)^n$. Simple problems.

UNIT – III

Fourier series on $(-\pi, \pi)$: Periodic function. Determination of Fourier coefficients. Statement of Dirichlet's conditions of convergence and statement of the theorem on convergence of Fourier Sine and Cosine series.

UNIT – IV

Third and Fourth order ordinary differential equation with constant coefficients. Euler's Homogeneous Equation. Second order differential equation : (a) Method of variation of parameters. (b) Method of undetermined coefficients. (c) Simple eigenvalue problem. Simultaneous linear differential equation with constant coefficients.

UNIT – V

Laplace Transform and its application to ordinary differential equation. Laplace Transform and Inverse Laplace Transform. Statement of Existence theorem. Elementary properties of Laplace Transform and its Inverse. Application to the solution of ordinary differential equation of second order with constant coefficients. Partial Differential Equation (PDE) : Introduction, Formation of PDE, Solutions of PDE, Lagrange's method of solution.

Text:

1. Basic Real & Abstract Analysis – Randolph J. P. (Academic Press).
2. A First Course in Real Analysis – M. H. Protter & G. B. Morrey (Springer Verlag, NBHM).
3. A Course of Analysis – Phillips.
4. Problems in Mathematical Analysis – B. P. Demidovich (Mir).
5. Problems in Mathematical Analysis – Berman (Mir).
6. Calculus of One Variable – Maron (CBS Publication).
7. Introduction to Real Analysis – Bartle & Sherbert (John Wiley & Sons.)
9. Mathematical Analysis – Parzynski.
10. Introduction to Real Variable Theory – Saxena & Shah (Prentice Hall Publication).
11. Real Analysis – Ravi Prakash & Siri Wasan (Tata McGraw Hill).
12. Mathematical Analysis – Shantinayakan (S. Chand & Co.).
13. Theory & Applications of Infinite Series – Dr. K. Knopp.

14. Advanced Calculus – David Widder (Prentice Hall).
- 15 Charles Chapman Pugh: Real mathematical analysis; Springer; New York; 2002
- 16 Sterling K. Berberian: A First Course in Real Analysis; Springer; New York; 1994
- 17 Steven G. Krantz: Real Analysis and Foundations; Chapman and Hall/CRC;. 2004
- 18 Stephen Abbott: Understanding Analysis; Springer; New York, 2002
- 19 T. M. Apostol: Mathematical Analysis, Addison-Wesley Publishing Co. 1957
- 20 W. Rudin: Principles of Mathematical Analysis, McGraw-Hill, New York, 1976
- 21 J. F. Randolph: Basic Real and Abstract Analysis, Academic Press; New York, 1968
- 22 Robert G Bartle, Donald R Sherbert: Introduction to real analysis; John Wiley Singapore; 1994

(2) Discrete Mathematics

Course Objective

To introduce the students with the Fundamentals of the Discrete Mathematics

. Course Outcomes

After the successful completion of this course students will be able to

1. *understand and represent integers.*
2. *know the concept of the congruences and apply them.*
3. *use the recurrence relations and generating functions.*
4. *apply the principles of the Boolean algebra.*

Course Content:

UNIT – I

Integers: Principle of Mathematical Induction. Division algorithm. Representation of integer in an arbitrary base. Prime integers. Some properties of prime integers. Fundamental theorem of Arithmetic. Euclid's Theorem. Linear Diophantine Equations. (Statement of Principle of Mathematical Induction, Strong form of Mathematical induction. Applications in different problems. Proofs of division algorithm. Representation of an integer uniquely in an arbitrary base, change of an integer from one base to another base. Computer operations with integers – Divisor of an integer, g.c.d. of two positive integers, prime integer, Proof of Fundamental theorem, Proof of Euclid's Theorem. To show how to find all prime numbers less than or equal

to a given positive integer. Problems related to prime number. Linear Diophantine equation – when such an equation has solution, some applications).

UNIT – II

Congruences : Congruence relation on integers, Basic properties of this relation. Linear Congruences, Chinese Remainder Theorem. System of Linear Congruences. (Definition of Congruence – to show it is an equivalence relation, to prove the following : $a \equiv b \pmod{m}$ implies (i) $(a+c) \equiv (b+c) \pmod{m}$ (ii) $ac \equiv bc \pmod{m}$ (iii) $an \equiv bn \pmod{m}$, for any polynomial $f(x)$ with integral coefficients $f(a) \equiv f(b) \pmod{m}$ etc. Linear Congruence, to show how to solve these congruences, Chinese remainder theorem – Statement and proof and some applications. System of linear congruences, when solution exists – some applications).

UNIT – III

Application of Congruences : Divisibility tests. Computer file, Storage and Hashing functions. Round-Robin Tournaments. Check-digit in an ISBN, in Universal Product Code, in major Credit Cards. Error detecting capability. (Using Congruence, develop divisibility tests for integers base on their expansions with respect to different bases, if d divides $(b-1)$ then $n = (a_k a_{k-1} \dots a_1 a_0)_b$ is divisible by d if and only if the sum of the digits is divisible by d etc. Show that congruence can be used to schedule Round-Robin tournaments. A university wishes to store a file for each of its students in its computer. Systematic methods of arranging files have been developed based on Hashing functions $h(k) \equiv k \pmod{m}$. Discuss different properties of this congruence and also problems based on this congruence. Check digits for different identification numbers – International standard book number, universal product code etc. Theorem regarding error detecting capability).

UNIT – IV

Congruence Classes : Congruence classes, addition and multiplication of congruence classes. Fermat's little theorem. Euler's Theorem. Wilson's theorem. Some simple applications. (Definition of Congruence Classes, properties of Congruence classes, addition and multiplication, existence of inverse. Fermat's little theorem. Euler's theorem. Wilson's theorem – Statement, proof and some applications).

UNIT – V

Recurrence Relations and Generating functions : Recurrence Relations. The method of Iteration. Linear difference equations with constant coefficients. Counting with generating functions. **Boolean Algebra** : Boolean Algebra, Boolean functions, Logic gates, Minimization of circuits.

Text:

1. C. L. Liu: Discrete Mathematics
2. Schaum's outline series: Discrete Mathematics