

**FACULTY OF PHYSICAL SCIENCE  
SYLLABI  
FOR  
B.Sc. (Mathematics & Computing)  
1<sup>st</sup> and 2<sup>nd</sup> SEMESTER  
EXAMINATIONS 2017-18, 2018-19 & 2019-20**



**DEPARTMENT OF MATHEMATICS  
PUNJABI UNIVERSITY, PATIALA**

**B.Sc. (Mathematics & Computing) Part I**  
**Outlines of Tests, Syllabi and Courses of Reading**  
**(Sessions 2017-18, 2018-19 & 2019-20)**

**SEMESTER-I**

<b>Code</b>	<b>Title of Paper/Subject</b>	<b>Hrs/ Week</b>	<b>Max Cont. Asmt.</b>	<b>Marks Univ Exam</b>	<b>Total</b>
MC101	Calculus- I	5	30	70	100
MC 102	Coordinate Geometry	5	30	70	100
MCS 103	Introduction to Information Technology	5	30	70	100
MCS 104 A	Computer Programming using C	5	10	40	50
MCS 104 B	Software Lab I (C- Programming)	4	20	30	50
MCSC 105	Mathematical Foundations of Statistics	5	30	70	100
PBI 109	Punjabi I/ Mudhla Gyan	5	25	75	100
	<b>Total</b>		175	425	600

**SEMESTER-II**

<b>Code</b>	<b>Title of Paper/Subject</b>	<b>Hrs/ Week</b>	<b>Max Cont. Asmt.</b>	<b>Marks Univ Exam</b>	<b>Total</b>
MC 201	Calculus- II	5	30	70	100
MC 202	Ordinary Differential Equations	5	30	70	100
MCS 203	Computer System Architecture	5	30	70	100
MCS 204 A	Object Oriented Programming using C++	5	10	40	50
MCS 204 B	Software Lab II (C++)	4	20	30	50
MCSC 205	Linear Programming	5	30	70	100
PBI 209	Punjabi II/ Mudhla Gyan	5	25	75	100
	<b>Total</b>		175	425	600

**In addition to the above papers the students in Semester II are also required to qualify the paper of Drug Abuse: Problem, Management and Prevention. The syllabus of this paper can be obtained from the web site [www.punjabiversity.ac.in](http://www.punjabiversity.ac.in)**

(Ist- Semester)

**MC 101: Calculus-I**

L    T    P  
4    1    0

Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

**Section-A**

**Differential Calculus:**  $\epsilon - \delta$  definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability. Applications of Derivatives. Asymptotes. Test for concavity. Points of inflexion. Tracing of Curves. (Scope as in Chapters 1,2,3 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition)

**Integral Calculus:** Integration of functions. Riemann sum and definite integrals. Properties, Area and the Mean value theorem, The fundamental theorem of Calculus. (Scope as in Chapters 4 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition)

**Section-B**

**Integral Calculus :** Integration by parts, Partial fractions and trigonometric substitutions. Applications of integrals. Areas between curves. Finding volumes by slicing. Volumes of solids of Revolution-Disks and Washers. Cylindrical Shells. Lengths of plane curves. Areas of surfaces of revolution. (Scope as in Chapters 5 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition)

**Infinite Series :** Limits of sequence of numbers. Theorems for calculating limits of sequences, Infinite Series. Bounded and Monotonic sequences, Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's Integral test. Ratio tests. Alternating series. Absolute and conditional convergence. Leibnitz Theorem,

Convergence of Taylor Series, Error Estimates. Applications of Power Series.  
(Scope as in Chapters 8 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition.

## Suggested Readings

1. George B. Thomas and Ross L. Finney: Calculus and Analytic Geometry, 9<sup>th</sup> Edition, Addison Wesley, 1998.
2. Liefhold, Louis: Calculus and Analytic Geometry, 2<sup>nd</sup> Edition, New York, Harper & Row 1972.
3. Lipmen Bers: Calculus, IBH Mumbai 1974.

## MC 102: Coordinate Geometry

L     T     P  
4     1     0  
Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

## Section-A

**Pair of Straight lines:** Joint equation of pair of straight lines and angle between them, condition of parallelism and perpendicularity, joint equation of the angle bisectors, joint equation of lines joining origin to the intersection of a line and a curve.

**Circle:** General equation of circle, circle through intersection of two lines, Tangents and Normals, Chord of contact, pole and polar, pair of tangents from a point, equation of chord in terms of midpoint, angle of intersection and orthogonality, power of a point w.r.t circle, radical axis, co-axial family of circles, limiting points.

**Conic:** General equation of conic, Tangents, normals, chord of contact, pole and polar, of tangents from a point, equation of chord in terms of midpoint, diameter. Conjugate diameters of ellipse and hyperbola, special properties of parabola, ellipse and hyperbola, conjugate hyperbola, asymptotes of hyperbola, rectangular hyperbola.

**Transformation of axes in two dimensions:** shifting of origin, rotation of axes, the second degree equation  $S=ax^2+2hxy+by^2+2gx+2fy+c=0$ , its invariants  $t$ , and  $O$ . Reduction of the second degree equation into standard form. Identification of curves represented by  $S=0$  (including pair of lines).

**Polar coordinates:** Polar equations of straight lines, circles and conics. Polar equation of chords, tangents normals only.

## Section-B

Review of lines and planes in 3-dimension, change of axes, shift of origin, rotation of axes, sphere, section of a sphere by a plane. Sphere through a given circle. Intersection of a line and sphere, tangent line, tangent plane, angle of intersection of two spheres and condition of orthogonality, power of a point w.r.t a sphere, Radical planes, radical axis, radical centre, coaxial family of spheres, limiting points, Cylinder, Cone with vertex at origin as the graph of homogeneous equation of second degree in  $x,y,z$ , cone as a surface generated by a line passing through fixed curve and a fixed point outside the plane of the curve, reciprocal cones, right circular and elliptic cones, right circular cone as a surface of revolution obtained by rotating the curve in a plane about an axis, enveloping cones, ellipsoid, equations of hyperboloids, paraboloids in the standard form, tangent planes and normals.

## References

1. P.K Jain and Khalil Ahmed: A text book of Analytical Geometry of two dimensions, Wiley Eastern Ltd, 1994.
2. P.K Jain and Khalil Ahmed: A text book of Analytical Geometry of three dimensions, Wiley Eastern Ltd, 1999.
3. Shanti Narayan and P.K Mittal: Analytical Solid Geometry, 17<sup>th</sup> Revised Edition, S.Chand and Co., New Delhi, 2006.

## **MCS 103: Introduction to Information Technology**

L     T     P  
4     1     0  
Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

#### **SECTION-A**

Historical Evolution of Computer: Characterization of Computers, types of Computers, the Computer generations. Basic Anatomy of Computers: memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM. Input-Output Devices: punched hole devices, magnetic media devices, printers, keyboard, scanners, OCR, OMR. Number System: non-positional and positional number systems, base conversion, fractional numbers, various operations on binary numbers: addition, subtraction, multiplication and division. Secondary Storage: sequential vs random storage, floppy, hard disk, optical disk.

#### **SECTION-B**

Computer Code: BCD, EBCDIC, ASCII, Grey Code

Computer Software: Introduction, types of software: application and systems software.

Computer Languages: Machine Language, assembly language, high level language, 4GL, assembler, compiler and interpreter. Networking: Basics, types of networks (LAN, WAN, MAN), topologies, communication media, Operating System, Definition, functions and types of operating system, E-commerce: meaning, advantages and application of e-commerce.

### **REFERENCES**

- 1 V Rajaraman, "Fundamentals of Computers", PHI, N. Delhi, 1996.
- 2 N Subramaniam, "Introduction to Computers", Volume-I.
- 3 Dr. Rajesh Trehan, "A Complete Book on IT", Cyber Tech.

## **MCS 104 A: Computer Programming using 'C'**

L T P

University Exam: 40

4 1 0

Internal Assessment: 10

Time Allowed: 3 hours

Total: 50

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

#### **SECTION-A**

Programming process: Problem definition, program design, coding, compilation and debugging. Identifiers and keywords, data types, input and output, type conversion, operators and expressions: Arithmetic, unary, logical and relational operators, assignment operator, conditional operator, library functions. Control statements: branching, looping, using for, while and do-while statements, nested control structures, switch, break and continue statement. Functions: definition, call prototype and passing arguments to a function, recursion versus iteration. User defined and library functions. Storage classes: automatic, external and static variables.

#### **SECTION-B**

Arrays: Definition, accessing elements, initialization, passing to functions, multi dimensional arrays, strings, Structure: variables, accessing members, nested structures. Pointers: address and differencing operators, declaration, assignment, passing pointer to functions, pointer arrays, pointer and arrays, pointer to structures, Files: reading, writing text and binary files. text vs binary files.

#### **TEXT BOOKS**

- 1 Byron Gottfried, "Programming with C. (Second edition), Schaum's outline series" Tata McGraw Hill Publishing Co.

### **REFERENCE BOOKS**

- 1 Ram Kumar and Rakesh Aggarwal: Programming in Ansi C, Tata McGraw Hill Publishing Co. Ltd. (2nd ed.).
- 2 B.W. Karrighan and D.M. Richie, "The C programming language", 2nd edition, (2003) PHI.
- 3 H.H. Tan & T.B. Dorazio, "C Programming for engineers & Computer Science", McGraw Hill (international edition).

### **MCS 104 B: Software Lab-I (C- Programming)**

L T P

0 0 4

Time Allowed: 3 hours

University Exam: 30

Internal Assessment: 20

Total: 50

Programs to be developed based upon various constructs in the C language



## MCSC 105: Mathematical Foundation of Statistics

L     T     P  
4     1     0  
Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

#### SECTION-A

Notion of Probability: Random experiment, sample space, axiom of probability, elementary properties of probability, equally likely outcome problems. Random Variables : Concept, cumulative distributive function, discrete and continuous random variables, expectations, mean, variance, moment generating functions. Discrete random variable: Bernoulli random variable, binomial random variable, generic random variable, Poisson random variable. Continuous random variables: Uniform random variable, exponential random variable, Gamma random variable, normal random variable.

#### SECTION-B

Conditional probability and conditional expectations, Bayes theorem, independence, computing expectation by conditioning; some applications- a list model, a random graph, Paly's urn model. Bivariate random variable: Joint distributions and conditional distributions, the correlation coefficient. Function of random variable: Sum of random variables. The laws of large numbers and the Central Limit Theorem, the approximation of distributions. Uncertainty, information and entropy, conditional entropy, solution of certain logical problems by calculating information.

#### REFERENCES

1. S.M. Ross, *Introduction to Probability Models* (Sixth edition) Academic Press, 1997
2. I. Blake, *An Introduction to Applied Probability*, John Wiley and Sons, 1979.
3. J. Pitman, *Probability*, Narosa, 1993.

**ਬੀ.ਐਸ.ਸੀ. (Mathematics & Computing) ਗਣਿਤ ਸਮੈਸਟਰ**

**2017-18, 2018-19 ਅਤੇ 2019-20 ਸੈਸ਼ਨ ਲਈ**

**ਸਮੈਸਟਰ ਪਹਿਲਾ**

**PBI 109 :- PUNJABI-I/ Mudhla Gyan\***

ਕੁਲ ਅੰਕ : 100

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ : 75 ਅੰਕ

ਸਮਾਂ:3 ਘੰਟੇ

ਵਿਸ਼ੇ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 40

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 12

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 28

(ਅਧਿਆਪਨ :5 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫਤਾ)

**ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

ਭਾਗ-ੳ: (1) **ਕਾਵਿ ਟਕਸਾਲ** (ਮੱਧਕਾਲੀਨ ਕਾਵਿ ਪੰਨੇ 1-34), (ਸੰਪਾਦਕ:ਤ੍ਰਿਲੋਕ ਸਿੰਘ ਆਨੰਦ ਅਤੇ ਅਨੁਪ ਵਿਰਕ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)

(2) **ਕਥਾ ਕਹਾਣੀ** (ਸੰਪਾਦਕ :ਰਘਬੀਰ ਸਿੰਘ ਅਤੇ ਦਰਬਾਰਾ ਸਿੰਘ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)

ਭਾਗ-ਅ: (1) **ਪੈਰੂ ਰਚਨਾ**- ਸਮਾਜਕ, ਵਾਤਾਵਰਣ ਜਾਂ ਸਭਿਆਚਾਰ ਨਾਲ ਸਬੰਧਤ।

(2) **ਵਿਆਕਰਣ**

(i) ਸਵਰ ਸਥਾਪਨਾ ਦੇ ਆਧਾਰ, ਪੰਜਾਬੀ ਸਵਰਾਂ ਦਾ ਵਰਗੀਕਰਨ ਤੇ ਆਧਾਰ, ਵਰਤੋਂ ਅਤੇ ਉਚਾਰਨ ਦੇ ਨਿਯਮ

(ii) ਵਿਅੰਜਨ:ਸਥਾਪਨਾ ਦੇ ਆਧਾਰ, ਪੰਜਾਬੀ ਵਿਅੰਜਨ ਧੁਨੀਆਂ, ਵਰਗੀਕਰਨ ਦੇ ਆਧਾਰ, ਵਰਤੋਂ ਅਤੇ ਉਚਾਰਨ ਵਿਧੀ ਤੇ ਸਥਾਨ

(iii) ਪੰਜਾਬੀ ਵਿਚ ਸੁਰ, ਬਲ ਅਤੇ ਨਾਸਿਕਤਾ ਦਾ ਉਚਾਰਨ ਅਤੇ ਨਿਯਮ

ਭਾਗ-ੲ ਸਾਰੇ ਸਿਲੇਬਸ ਤੇ ਆਧਾਰਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

**ਅੰਕ -ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ**

1. ਸਿਲੇਬਸ ਦੇ ਸਾਰੇ ਭਾਗਾਂ ਵਿਚੋਂ ਪ੍ਰਸ਼ਨ ਖੁੱਛੇ ਜਾਣਗੇ।

2. ਪੇਪਰ ਨੂੰ ਤਿੰਨ ਭਾਗਾਂ ਲ਼,ਅ,ਅਤੇ ਲ ਵਿੱਚ ਵੰਡਿਆ ਜਾਵੇਗਾ।

3. ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ ਜਾਂ ਸਾਰ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

4. ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 07 ਅੰਕ

5. ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ/ਸਾਰ ਜਾਂ ਪਾਤਰ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

6. ਸਮਾਜਿਕ ਵਾਤਾਵਰਣ ਜਾਂ ਸਭਿਆਚਾਰ ਨਾਲ ਸੰਬੰਧੀ ਪੈਰੂ ਰਚਨਾ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 08 ਅੰਕ

7. ਵਿਆਕਰਣ ਸੰਬੰਧੀ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

8. ਭਾਗ ਲ ਉਪਰੋਕਤ ਸਿਲੇਬਸ ਸੰਬੰਧੀ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 ਪ੍ਰਸ਼ਨ ਖੁੱਛੇ ਜਾਣਗੇ। ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਸਾਰੇ

ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ।

**15x2=30 ਅੰਕ**

## ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

1. ਜਸਵਿੰਦਰ ਸਿੰਘ, ਨਵੀਂ ਪੰਜਾਬੀ ਕਵਿਤਾ: ਪਛਾਣ ਚਿੰਨ੍ਹ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ,
2. ਡਾ. ਰਾਚਿੰਦਰ ਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪੁਨਰ ਚਿੰਤਨ , ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ.
3. ਖੋਜ ਪੜ੍ਹਕਾ, (ਗਲਪ ਵਿਸ਼ੇਸ਼ ਅੰਕ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ.
4. ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਧਾਲੀਵਾਲ, ਪੰਜਾਬੀ ਕਹਾਣੀ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ.
5. ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ, ਭਾਸ਼ਾ ਵਿਗਿਆਨ: ਸੰਕਲਪ ਤੇ ਦਿਸ਼ਾਵਾਂ , ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ.
6. ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨਕ ਭਾਗ I,II,III, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ.

**Mudhla Gyan\* as per University Guidelines. Syllabus is available on University website.**

(2nd semester)

## MC 201: Calculus-II

L      T      P  
4      1      0  
Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C

#### Section-A

**Vector Analysis :** Vectors in the plane Cartesian Co-ordinates and vectors in spaces. Dot and cross products. Lines and planes in space, Cylinders and Quadric surfaces. Cylindrical and Spherical co-ordinates Vector valued functions and space curves. Modelling Projectile Motion. Arc length and Unit Tangent vector curvature, Torsion and the TNB Frame. Line and Surface integrals.

(Scope as in chapters 10, 11 and 14 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition)

#### Section-B

**Multivariable Functions:** Functions of several variables. Limits and continuity. Partial derivatives. Differentiability. The chain rule, Directional derivatives, Gradient vectors and tangent planes. Extreme values and saddle points. Lagrange multipliers Double integrals. Double integrals in Polar Form. Triple integrals in Rectangular co-ordinates. Triple integrals in Cylindrical and Spherical co-ordinates.

(Scope as in Chapters 12 and 13 of Calculus and Analytic Geometry by Thomas and Finney, Ninth Edition).

#### Suggested Readings

1. George B. Thomas and Ross L. Finney: Calculus and Analytic Geometry, 9<sup>th</sup> Edition, Addison Wesley, 1998.

2. Liefhold, Louis: Calculus and Analytic Geometry, 2<sup>nd</sup> Edition, New York, Harper & Row 1972.
3. Lipmen Bers: Calculus, IBH Mumbai 1974.

## **MC 202: Ordinary Differential Equations**

L     T     P  
4     1     0

Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C

#### **Section-A**

**Ordinary differential equations:** Basic definitions: order and degree of differential equation, primitives, solutions of differential equations, Integral curves, isoclines.

First order differential equations: Linear, non-linear differential equations, Variables separable, homogeneous, non-homogeneous exact equations and integration factors, equations reducible to first order, Clairaut's equation and Geometrical interpretation of first order differential equation, applications.

Successive approximations, Lipschitz condition, Statements of Existence and Uniqueness of solution of first order differential equations.

#### **Section-B**

**Second order Differential Equations:** Linear equations with constant coefficients. Standard Methods for solution, Nonhomogeneous, linear with constant coefficients. Method of Variation of Parameter, Linear Independence, Linear dependence, Wronskian. Second order linear equation with variable coefficient.

Euler equation, regular singular points, ordinary points, series solution. Method of Frobenius, Applications, Legendre's, Hermite's and Bessel's equation.

#### **Suggested Reading**

1. W.E.Boyce and P.C.Diprima : Elementary Differential Equations and Boundary value problems, John Wiley, 1986.

2. Coddington, E.A. : An Introduction to Ordinary Differential Equations. Prentice-Hall (India),1961, (Chapters I-V).
3. E.L.Ince : Theory of Ordinary Differential Equations. Dover ,1956.
4. E. D. Rainville: Elementary Differential Equations, Bedient Publisher Prentice Hall, 1997.

## **MCS 203: Computer Systems Architecture**

L      T      P  
4      1      0

Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

#### **Section A**

Basic computer architecture, functional organization, Register organization, arithmetic and logic unit, central processing unit, Instruction formats, Addressing modes, Data transfer and manipulation, Interrupts, RISC/CISC architecture. Boolean algebra, Basic Gates, Combinational logic design: half-adder, full adder, parallel adder. Sequential circuits: concept, flip-flops (D, RS, JK, JK-Master-Slave, T), Counters (Ripple, Asynchronous Synchronous, Decade, Mod-5).

#### **Section B**

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit, Memory organization: memory hierarchy, Memory types: cache, associative and other types. I/O organization: Peripheral devices, I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA,I/O processor.

#### **Text Books**

- 1 M.M. Mano, "Computer System Architecture", Third Edition, Prentice Hall of India, 2002.
- 2 A.S. Tannenbaum, "Structured Computer Organisation", Prentice- Hall of India, 1999.
- 3 William Stallings, "Computer Organisation and Architecture", 6th edition, Pearson Education, 2000.

## **MCS 204 A: Object Oriented Programming with "C++"**

L T P

University Exam: 40

4 1 0

Internal Assessment: 10

Time Allowed: 3 hours

Total: 50

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

### **SECTION A**

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms.

Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.

Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator. Type conversion, Variable declaration, expressions, statements, manipulators. Input and output statements, stream I/O, Conditional and Iterative statements. Storage Classes: Automatic, Static, Extern, Register. Arrays, Arrays as Character Strings.

Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Pointer to functions.

Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by value, by

address and by reference, Functions returning references, recursion, Default Arguments, Const arguments.

## SECTION B

Pre-processor: #define, #error, #include, #if, #else, #endif, #ifdef, #ifndef, #undef

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer.

Objects: Object as function arguments, array of objects, Const member functions. Static data members and Static member functions. Friend functions and Friend classes.

Constructors: properties, types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes. Destructors: Properties, Virtual destructors. Destroying objects. Rules for constructors and destructors.

Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes. Scopes: Local, Global.

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, constructors in derived class.

Polymorphism : Operator overloading and Function overloading.

### TEXT BOOKS

1. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill, 2001.
2. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001

### REFERENCE READINGS

1. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 1994.
2. Bjarne Strastrup, "The C++ Programming Language", Addison- Wesley Publication Co., 2001.
3. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw-Hill, 2001

## MCS 204 B -Software Lab-II (C++)

L T P

0 0 4

Time Allowed: 3 hours

University Exam: 30

Internal Assessment: 20

Total: 50

Programs to be developed based upon various constructs in the C++



## **MCSC 205: LINEAR PROGRAMMING**

L     T     P  
4     1     0  
Time Allowed: 3 hours

University Exam: 70  
Internal Assessment: 30  
Total: 100

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and and Section C will be of 30 marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C

### **SECTION A**

Mathematical Programming Problems, Linear programming problems (LPPs); Examples, Mathematical formulation, Graphical solution, Solution by Simplex method, Artificial variables, Big-M method and Two phase method. Duality in linear programming; Concept, Mathematical formulation, fundamental properties of duality, duality and simplex method and dual simplex method.

### **SECTION B**

Sensitivity Analysis : Discrete changes in the cost vector, requirement vector and Co-efficient matrix (Numerical Problems Only). Transportation problem ; initial basic feasible solution and Optimal solutions using MODI method (for balanced cases only) Assignment problem; Formulation of Assignment Problems, solution of balanced and unbalanced assignment problems, maximization case in assignment problem.

### **TEXT BOOKS**

1. Kanti Swarup, P.K. Gupta and Manmohan : 'Operations Research', Sultan Chand and Sons, New Delhi.

### **RECOMMENDED READING**

1. Kasana, H.S. and Kumar K.D. : Introductory Operations Research, SIE 2003

**ਬੀ.ਐਸ.ਸੀ. (Mathematics & Computing) ਸਮੈਸਟਰ**

**2017-18, 2018-19 ਅਤੇ 2019-20 ਸੈਸ਼ਨ ਲਈ**

**ਸਮੈਸਟਰ ਦੂਜਾ**

**PBI 209:- PUNJABI-II / Mudhla Gyan\***

ਕੁਲ ਅੰਕ : 100

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ : 75 ਅੰਕ

ਸਮਾਂ: 3 ਘੰਟੇ

ਵਿਸ਼ੇ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 40

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 12

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 28

(ਅਧਿਆਪਨ : 5 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

**ਸਿਲੇਬਸ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

- ਭਾਗ-ਓ: (1) **ਕਾਵਿ ਟਕਸਾਲ** (ਆਧੁਨਿਕ ਕਾਵਿ, 35-70), (ਸੰਪਾਦਕ: ਤ੍ਰਿਲੋਕ ਸਿੰਘ ਆਨੰਦ ਅਤੇ ਅਨੂਪ ਵਿਰਕ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)
- (2) **ਇਕਾਂਗੀ ਯਾਤਰਾ** (ਸੰਪਾਦਕ : ਰਘਬੀਰ ਸਿੰਘ ਅਤੇ ਸਤੀਸ਼ ਕੁਮਾਰ ਵਰਮਾ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)
- ਭਾਗ-ਅ: (1) ਹਰੇਕ ਵਿਸ਼ੇ ਨਾਲ ਸਬੰਧਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ (ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਤੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ)
- (2) **ਵਿਆਕਰਣ**
- (i) ਸ਼ਬਦ: ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ, ਮਿਸ਼ਰਤ ਅਤੇ ਸੰਯੁਕਤ ਪੰਜਾਬੀ ਸ਼ਬਦ ਦੀ ਬਣਤਰ, ਵਧੇਤਰ, ਅਗੇਤਰ, ਪਿਛੇਤਰ
- (ii) ਸ਼ਬਦ ਰਚਨਾ: ਸੰਕਲਪ, ਰੂਪ ਅਰਥ ਅਤੇ ਸ਼ਰੇਣੀ ਦੇ ਪੱਖ ਤੋਂ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰੂਪਾਂ ਦਾ ਸਰੂਪ ਅਤੇ ਨਿਰਮਾਣ ਵਿਧੀ।
- (iii) ਸ਼ਬਦ ਸ਼ਰੇਣੀਆਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ)
- ਭਾਗ-ੳ ਸਾਰੇ ਸਿਲੇਬਸ ਤੇ ਆਧਾਰਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

**ਅੰਕ -ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ**

1. ਸਿਲੇਬਸ ਦੇ ਸਾਰੇ ਭਾਗਾਂ ਵਿਚੋਂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਪੇਪਰ ਨੂੰ ਤਿੰਨ ਭਾਗਾਂ ਓ, ਅ, ਅਤੇ ਏ ਵਿੱਚ ਵੰਡਿਆ ਜਾਵੇਗਾ।
3. ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ ਜਾਂ ਸਾਰ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ
4. ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 07 ਅੰਕ
5. ਕਿਸੇ ਇਕਾਂਗੀ ਦਾ ਵਿਸ਼ਾ/ਸਾਰ ਜਾਂ ਪਾਤਰ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ
6. ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਪੰਜਾਬੀ ਰੂਪ ਜਾਂ ਅਨੁਵਾਦ (ਅੱਠ ਵਿੱਚੋਂ ਚਾਰ)  $4 \times 2 = 08$  ਅੰਕ ਅਤੇ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤੋਂ
7. ਵਿਆਕਰਣ ਸੰਬੰਧੀ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

8. ਉਪਰੋਕਤ ਸਿਲੇਬਸ ਸੰਬੰਧੀ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ।

15x2=30 ਅੰਕ

### ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

1. ਜਸਵਿੰਦਰ ਸਿੰਘ, ਨਵੀਂ ਪੰਜਾਬੀ ਕਵਿਤਾ: ਪਛਾਣ ਚਿੰਨ੍ਹ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ,
2. ਡਾ. ਰਾਜਿੰਦਰ ਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪੁਨਰ ਚਿੰਤਨ , ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ.
3. ਖੋਜ ਪੜ੍ਹਕਾ, (ਨਾਟਕ ਵਿਸ਼ੇਸ਼ ਅੰਕ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ.
4. ਰੋਸ਼ਨ ਲਾਲ ਆਹੂਜਾ, ਇਕਾਂਗੀ ਕਲਾ, ਪੰਜਾਬ ਸਟੇਟ ਟੈਕਸਟ ਬੁਕ ਬੋਰਡ ਚੰਡੀਗੜ੍ਹ.
5. ਸਤੀਸ਼ ਕੁਮਾਰ ਵਰਮਾ, ਪੰਜਾਬੀ ਨਾਟਕ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ.
6. ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨਕ ਭਾਗ I,II,III, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ.

**Mudhla Gyan\* as per University Guidelines. Syllabus is available on University website.**