SEMESTER – I
BASIC COMPUTER SKILLS

1. Course Description:

Programme: BA/B.Sc./B.Com./BMS

Course Code: U24/BCS/AECC/101

Type of course: AECC

No. of credits: 2

Max. Hours: 30

Hours per week: 2

Max. Marks: 50

2. Course Objectives:

To impart a basic level understanding of working of a computer and its usage.

3. Course Outcome:

On completion of the course the student will be able to:

CO1: *Interpret* basics of computers and *Use* word processing software

(Cognitive levels – 3)

CO2: *Define* Internet Technologies and *Use* Spreadsheets and Presentation Software

(Cognitive level – 3)

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4. Course Content:

MODULE I: BASICS OF COMPUTERS AND WORD PROCESSING   (15 Hrs)

Understanding Of Computer: Introduction to computers - functions, features, classification; Computer Architecture - components; Computer Hardware - input devices, output devices; Computer Memory -primary memory, secondary memory, cloud; Computer Software - system software, application software, special purpose software, system utilities, open-source software, and proprietary software; Operating Systems - functions, types, real time operating systems,

Windows Ui And Word Processing: Windows desktop – icons, task bar, start menu, understanding of local system drives, folders and files – creating, viewing, renaming, deleting; MS-Word - opening , closing, saving of documents, title bar, ribbon and tabs, ruler; text creation and manipulation – insert, delete, select, cut, copy and paste, find and replace, correct errors - spell; formatting text – font size, size, colour, bold, underline, italic, changing text case, text alignment; creating first line indent of paragraphs; formatting page – inserting header and footer, page breaks; modifying page layout - changing page orientation , page size, page margins; tables – inserting, adding and deleting rows and columns, converting text to table, working with lists, using symbols as bullets, printing documents

MODULE II: INTRODUCTION TO INTERNET TECHNOLOGY, SPREADSHEETS AND PRESENTATION SOFTWARE   (15Hrs)

Overview of Internet and Future Technology: Internet – advantages and disadvantages of internet; Terms related to internet – WWW, web page, website, web browser, web address and URL, blog, search engine; Services of Internet – chatting, e-mail, video- conferencing, e-learning, e-banking, e-shopping, e-reservation; Social networking sites – LinkedIn, Facebook, Instagram; Computer Security – sources of cyber-attack, malware, threats to computer security, solutions to computer security threats; Future Technology – Internet of Things(IoT), Big Data Analytics, Virtual Reality, Artificial Intelligence,

Spreadsheet and Presentation Software: Spreadsheets - Workbook, worksheet, MS Excel vs Google sheets; basics of spreadsheet – enter, select, delete, move, copy and paste data, fill numbers, text, date; adding borders to cells, functions – count, sum, average; formulas – simple, relative reference, absolute reference, printing worksheet; Presentation – introduction to slide, placeholder, notes, adding slides, changing layouts of slides, applying styles and background, adding text box and pictures, adding animations, setting slide transitions, saving single slide as image, saving presentation in different formats (ppt, pdf, video)

5. References:

1. Microsoft Office Step by Step (Office 2021 and Microsoft 365), Joan Lambert, 1st edition, 2022
2. Computer Basics with Office Automation, Archana Kumar, Wiley publications,2019
3. Introduction to Computers, Peter Norton, McGraw-Hill ,2012.
4. Fundamentals of Computers, Reema Thareja,2nd Edition 2019.

Department of Computer Science, St. Francis College for Women, Hyderabad

6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
GLOBAL DEVELOPMENT	Basic computer skills such as word processing, spreadsheets, presentations, and the internet, are essential for most jobs and are considered valuable skills in the workforce. Good computer skill aligns with an individual's career goals and enhances productivity and effectiveness in the workplace.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD, EMP	Module 1	Assignment
SD, EMP	Module 2	Skill practical test

7. Course Assessment Plan

a) Weightage of Marks in Formative and Summative Assessments

Formative Assessment - FA (40%)	Summative Assessment - SA (60%)
CIA-20 marks **Mini project/Assignment/** **Problem solving/Case studies**	**End Semester Exam-30 Marks**

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b) Model Question Paper - End Semester Exam

BASIC COMPUTER SKILLS

Course Code: U24/BCS/AEEC/101   **Max Time: 1 Hr**
Credits: 2   **Max. Marks: 30**

Answer any 5 of the following: **5 X 6 = 30 M**

1. Explain Computer Architecture.
2. Differentiate between Primary and Secondary Memory.
3. Explain functions of an Operating System.
4. Define types of Software.
5. Write a short note on the Internet.
6. List and explain the services of the Internet.
7. Explain with example the concept of IoT.
8. Explain various threats to computer systems.

Prepared by	Checked & verified by	Approved by
Ms. Prabhmeet Teaching Faculty	Ms. D. Sowjenya HOD	Dr. Uma Joseph Principal

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BASIC MATHEMATHEMATICS FOR ECONOMICS -1

SEMESTER – I

BASIC MATHEMATICS FOR ECONOMICS -I

1. Course Description

Programme: B.A
Course Code: U24/ECO/DSC/101/P
Type: DSC
No. of credits: 1

Max. Hours   :30
Hours per week: 2
Max. Marks: 50

2. Course Objectives:

The students learn to estimate and apply various economic concepts and their working.

3. Course Outcome

On completion of the course the student will be able to:
Analyse the cost, revenue and profit functions
Understand the application of functions in Economics

4. Course Content

1. Variables – Constants, Parameters, Equations and Identities

2. Relations and Functions, Types of Functions- linear, Quadratic, and cubic function, Constant function, Polynomial Function Rational Function, exponents, Homogenous function and its application in economics

3. Concept of Intercept and Slope of the line, its Application in Economics

4. Differentiation of a function- elasticity of demand, supply, utility analysis,

5. Second order derivates – partial derivates, profit maximization, cost minimization, equilibrium of a firm

Prepared by Course Teacher [Name & Signature]	Checked &Verified by HoD / Programme Coordinator [Name & Signature]	Approved by the Principal
[signature] 28/2/24	*[signature]* 28/2/24	*[signature]*
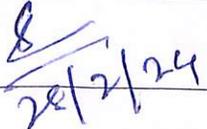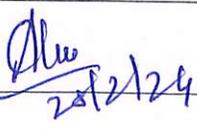
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SEMESTER - I

DESCRIPTIVE STATISTICS& PROBABILITY THEORY

- **Course Description**

Programme: B.Sc

Course Code: U24/STA/DSC/101

Course Type: DSC 1B

No. of credits: 4

Max. Hours: 60

Hours per week:4 hrs.

Max. Marks:100

- **Course Objectives:**

- To tabulate statistical information given in descriptive form and to use graphical techniques to interpret and compute various measures of central tendency, dispersion, skewness and kurtosis.

- To find the probabilities of events.

- To analyze data pertaining to discrete and continuous variables and to interpret the results and also obtain a probability distribution of random variable (one or two dimensional) in the given situation.

3. **Course Outcomes :**

On completion of the course the student will be able to:

CO 1: **Understand** various methods of collecting data and get familiar with some elementary methods of data viz. Measures of central tendency, dispersion, skewness and kurtosis and to **Apply** them.

CO2 : **Apply** the basic concepts of probability to find probabilities of various events.

CO 3 : Understand types of random variables, concepts of conditional probability and ability to **analyze** univariate and bivariate probability distributions; transformation of continuous random variable and to **apply** them.

CO 4 : **Memorize** characteristics of random variables such as expectation, variance and also to compute various generating functions

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4. Course Content:

MODULE-I: Descriptive Statistics: (15 HOURS)

Measurement scale - nominal, ordinal, interval and ratio. Concept of primary and secondary data. Methods of collection and editing of primary data. Sources and editing of secondary data. Construction of Frequency distribution, Classification and tabulation of data. Review of Measures of Central tendency and Dispersion.

Importance of moments, central and non-central moments, and their interrelations, Sheppard's corrections for moments for grouped data. Measures of skewness and kurtosis based on moments.

MODULE- II: Probability (18 HOURS)

Basic concepts of probability, deterministic and random experiments, trial, outcome, sample space, event, operations of events, exclusive and exhaustive events, equally likely and favourable events with examples, Mathematical, Statistical and Axiomatic definitions of probability, their merits and demerits. Properties of probability based on axiomatic definition, Conditional probability and independence of events, Addition and multiplication theorems for 'n' events, Boole's inequality and Bayes' theorem, Problems on probability using counting methods and theorems

MODULE- III: Random Variables & Expectation (15 HOURS)

Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations. Distribution function and its properties, Transformation of one-dimensional random variable (simple 1-1 functions only), Notion of bivariate random variable, bivariate distribution, statements of its properties, joint, marginal and conditional distributions, Independence of random variables.

Mathematical expectation of a function of a random variable, Raw and central moments, covariance using mathematical expectation with examples, Addition and multiplication theorems of expectation.

MODULE- IV: Generating functions & Indian Official Statistics (12 HOURS)

Definitions of moment generating function (m.g.f), characteristic function (c.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and statements of their properties with applications, Chebyshev's and Cauchy-Schwartz's inequalities and their applications. **Indian Official Statistics:** Function and organizations of CSO and NSSO. Agricultural Statistics, area and yield statistics. National income and its computation, utility and difficulties in estimation of national income.

5. References:

1. V.K.Kapoor and S.C.Gupta(2010): Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi

2.   Sanjay Arora and Bansi Lal(2000):New mathematical Statistics: SatyaPrakashan, New Delhi

3.   S.C.Gupta and Kapoor (2010): Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi.

4.   B. L. Agarwal(2007) : Programmed Statistics, New Age International Publishers,New Delhi.

5.   Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I& II, 8th Edn. The World Press, Kolkata.

6.Syllabus Focus

a)Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	Descriptive statistics, probability theory and random variables have diverse applications across various fields including data analysis, decision making, gaming theory, risk assessment, modelling uncertainty, and predictive modelling. These statistical concepts provide essential tools for understanding and analysing data, making predictions and helps in creating visual representations of data such as histograms, box plots and scatter plots.

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b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Probability	Proficiency in probability offers various skill opportunities that are highly valued across different industries and domains. Those are risk assessment& management, predictive modelling and forecasting, financial modelling and analysis , Game theory. It equips individuals with valuable analytical and decision making skills.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	MCQ test	Experiential learning
2.	Assignment	Experiential learning
3.	Case Study	Problem Solving

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8. Course Assessment Plan

a)Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA-1- Written Exam	Written Exam
CO2	CIA-1- Written Exam	
CO3	CIA-2 written test/Assignment	
CO4	CIA-2 MCQ test	

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b) Model Question Paper- End Semester Exam

DESCRIPTIVE STATISTICS &PROBABILITY THEORY

THEORY

Course Code: U24/STA/DSC/101   **Max. Marks: 60**

Credits : 4   **Time: 2 Hrs.**

SECTION –A (Essay Questions)

I. Answer the following   **4X10=40 Marks**

1.   Explain the Various methods of collecting primary data and secondary data ?

OR

2. Define the raw and central moments of a frequency distribution? Derive the relationship between central moments in terms of raw moments?

3. State and prove Baye's theorem

OR

4.A bag contains 6 white and 9 black balls. Four balls are drawn at a time from the bag. Find the probability for the first draw to give 4 white and the second draw to give 4 black balls in each of the following cases :

a) The balls are replaced into the bag before the second draw.

b) The balls are not replaced into the bag before the second draw.

5.(i) Define Distribution Function of a random variable and State its properties?

(ii) A D.T.P operator's profit (X) per page is a random variable with the pdf

$$f(x) = \begin{cases} \frac{1}{8}(x+1), & -1 < x < 5 \\ 0, & elsewhere \end{cases} \qquad f(x) = \begin{cases} \frac{1}{8}(x+1), & -1 < x < 5 \\ 0, & elsewhere \end{cases}$$

Where the units are in rupees. Find the expected value and variance of the profit.

OR

6. State and prove addition theorem of expectation for 'n' random variables.

7. Define CGF of a r.v. Establish the relationship between the moments and cummulants.

OR

8. Write in detail about national income and its computation.

SECTION –B (Short Answer Questions)

II. Answer any FOUR.   **4x5=20 Marks**

9. What are the requisites of a statistical table?

10. Show that coefficient of kurtosis is greater than unity.

11. If A and B are independent events then show that $\bar{A}$ and $\bar{B}$ are also independent.

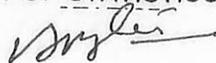12. A random variable X has the following probability distribution

X=x : -2 -1   0   1   2   3

P(x) : 0.1 k 0.2 2k 0.3 3k

(i) Find k (ii) Evaluate $P(X<20)$, $P(X\geq1)$

13. Define Expectation. State its properties.

14. Define MGF of a r.v 'X' and state its properties.

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SEMESTER I

DESCRIPTIVE STATISTICS & PROBABILITY THEORY PRACTICAL

Course Description

Programme : B.Sc   No of Hrs allotted: 2Hrs./Week

Course Code :U24/STA/DSC/101/P   Max . Marks: 50
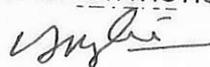
Course Type: DSC IB

No of Credits : 1

Course Outcomes:

1. **Interpret** the data diagrammatically and graphically.

2. **Apply** the computational knowledge of measures of central tendency, dispersion, coefficients of skewness and kurtosis.

Course Content :

1.   Diagrammatic presentation of data (Bar, Pie ,Stem and leaf and Box-plots).
2.   Graphical presentation of data (Histogram, Frequency polygon, Ogives) .
3.   Computation of Measures of Central tendency and partition values (For ungrouped and grouped data)
4.   Computation of Measures of Dispersion (For ungrouped and grouped data)
5.   Computation of Non-central and Central moments –Sheppard's corrections for grouped   data.
6.   Computation of Karl Pearson and Bowley's coefficients of Skewness .
7.   Problems on Baye's Theorem.

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DESCRIPTIVE STATISTICS & PROBABILITY THEORY

PRACTICAL

Course Code: U24/STA/DSC/101/P   **Max. Marks: 50**

Credits : 1   **Time: 2 Hrs.**

Answer any THREE questions.   **3 x 13 = 39**

1. (a)The following data relates to the age distribution of 1000 workers in an industry Draw less than Ogive curve

Age(Years)	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No of workers	120	125	180	160	150	140	100	25

(b) The following data represents the defects in all computer key-boards produced by a company during a three –month period. Draw pie diagram.

Cause	Frequency
Black spots	413
Spray mark	292
Jetting	258
Pin mark	834
Scratches	442
Shot mold	275

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2. (a) A person owns two petrol filling stations A and B. At station A, a representative sample of 200 consumers who purchase petrol were taken. The results were as follows.

Number of litres of petrol purchased	0-2	2-4	4-6	6-8	8-10	10-12
Number of consumers	4.5	5.0	6.5	7.0	8.0	9.0

A similar sample at station B users showed a mean of 4 litres with a standard deviation of 2.2 litres. At which station is the purchase of petrol relatively more variable.

(b) An automobile insurance company divides customers into three categories good risks, medium risks and poor risks, Assume that 70% of the customers are good risks, 20% are medium risks, and 10% are poor risks. Assume that during the course of a year, a good risk customer has probability 0.005 of filing an accident claim, a medium risk customer has a probability 0.01, and a poor risk customer has probability 0.025. A customer is chosen at random. What is the probability that the customer is a good risk and has filed a claim?

3. For the following frequency distribution, compute first four central moments and find coefficient of skewness and kurtosis. Apply Sheppard's corrections.

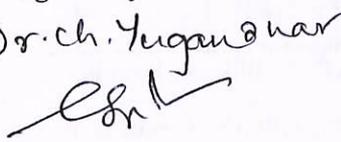| CI	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	8	10	19	23	18	13	4

4. An automobile travelling on a road that has a posted speed limit of 55 miles per hour is checked for speed by a state police radar system. A frequency distribution of speeds is as follows.

Speed(Miles/hr)	45-50	50-55	55-60	60-65	65-70	10. 0-75	11. 5-80
Frequency	12.0	13.0	14.50	15.75	16.5	17.5	18.0

Calculate karl Pearson's and Bowley's coefficient of Skewness.

4. **CO mapping with PO's**

CO	PO	Cognitive level
1	2	Apply
2	2	Apply

Prepared by	Checked &Verified by	Approved by
Name and Signature of the teaching faculty Dr.ch. Yugandhar	**Name and Signature of HoD** Dr.Ch. Yugandhar	**Name and Signature of Principal**

SEMESTER - I

DIFFERENTIAL AND INTEGRAL CALCULUS

1. Course Description

Programme   : B. Sc
Course Code : U24/MAT/DSC/101
Course Type : DSC I
No. of credits : 4

Max. Hours   : 60
Hours per week : 4
Max. Marks   : 100

2. Course Objectives

- To acquaint the students with concepts of Differential Calculus.

- The notion of instantaneous rate of change finds applications in Geometry, Mechanics other branches of Theoretical Physics and also to Social Sciences like Economics and Psychology.

3. Course Outcomes

On completion of the course the student will be able to:

CO 1: Interpret the successive differentiation, Partial derivatives, total derivatives of the given functions of two variables. **(INTERPRET)**

CO 2: Apply the concepts to find maximum and minimum values of functions and to expand functions as power series. **(APPLY)**

CO 3: Examine the concepts of Curvature and its derivation. **(EXAMINE)**

CO 4: Evaluate the length of plane curves and volume of surfaces of revolution. **(EVALUATE)**

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4. Course Content

MODULE I: (15 HRS)

SUCCESSIVE DIFFERENTIATION:

Higher order derivatives, Calculation of the nth derivative, some standard results.

PARTIAL DIFFERENTIATION :

Introduction, Functions of two variables, Neighbourhood of a point (a, b), Continuity of a function of two variables, Continuity at a point, Limit of a function of two variables, Partial Derivatives, Geometrical representation of a function of two variables, Homogeneous functions, Theorem on total differentials, Composite Functions, Differentiation of Composite functions, Implicit functions.

Sections: 5.1, 5.2 11.1 to 11.9.
Pg No's: 166-172, 356-385.

MODULE II: (15 HRS)

PARTIAL DIFFERENTIATION

Equality of $f_{xy}(a,b)$ and $f_{yx}(a,b)$, Taylor's theorem for a function of two variables

MAXIMA AND MINIMA:

Maximum value of a function, minimum value of a function, A necessary condition for extreme values, Sufficient condition for extreme value, Maxima and Minima of function of two variables, Lagrange's method of undetermined multipliers.

Sections: 9.1 to 9.3, 9.6, 9.7, Pg No's 281-286, 310-333,
Sections: 11.10, 11.11, Pg No's 386-392

MODULE III: (15 HRS)

CURVATURE AND EVOLUTES:

Introduction, Definition of Curvature, Radius of Curvature, Length of Arc as a function, Derivative of Arc, Radius of Curvature, Cartesian equations, Newtonian method, Centre of Curvature, Chord of Curvature, Evolutes and Involutes, Properties of the Evolutes.

Sections: 14.1 to 14.8
Pg No's 421-453

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MODULE IV: (15 HRS)

LENGTHS OF PLANE CURVES
Introduction-Expression for the Lengths of the curves $y=f(x)$
Expressions for the Length of arcs $x=f(y)$: $x=f(t)$, $y=\varphi(t)$; $r=f(\theta)$

VOLUMES AND SURFACES OF REVOLUTION

Introduction- Expression for the Volume obtained by revolving about either axis, Expression for the Volume obtained by revolving about any line.

> **Sections: 8.1 to 8.3 Pg. No's 183-189**
> **Sections: 9.1 to 9.3 Pg No's 196-208.**

5. References

1. Shanti Narayan, Dr. P.K. Mittal, *Differential Calculus*, S. Chand Publications, 2016 Reprint.
2. Shanti Narayan, Integral Calculus, S.Chand, New Delhi
3. William Anthony Granville, Percey F Smith and William Raymond Longley; Elements of the differential and integral calculus
4. Joseph Edwards, Differential calculus for beginners
5. Smith and Minton, Calculus
6. Elis Pine, How to Enjoy Calculus
7. Hari Kishan, Differential Calculus
8. B.Sc. First Year Mathematics published by Telugu Akademi.

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6. Syllabus Focus

a) Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	Differential equations find widespread application in modelling various phenomena in physics, chemistry, and biology, as well as in computer applications such as algorithms and data structures

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module 1: Successive Differentiation	Plotting a graph using Sage Software
Employability	Module 2: Taylor Series	Calculation of functions involving exponential, logarithmic, trigonometric etc.
Skill Development	Module 3: Involutes	Tracing curves using Maple Software

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Skill Tests
2.	Experiential Learning	Quiz
3.	Problem solving	Group Discussions, Assignments

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA-I(Written Exam)	End Semester Examination
CO2	CIA-I(Written Exam)	
CO3	CIA-II (Skill Tests)	
CO4	CIA-II (Assignments)	

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CBCS 2024   DIFFERENTIAL AND INTEGRAL CALCULUS

b) Model Question Paper- End Semester Exam

DIFFERENTIAL AND INTEGRAL CALCULUS

Course code: U24/MAT/DSC/101   Max. Marks: 60M
No. of credits: 4   Time: 2 Hrs

SECTION-A

I. Answer the following   4 x10= 40 M

1. If $x^x y^y z^z = c$, show that at $x = y = z$, $\dfrac{\partial^2 z}{\partial x \partial y} = -(x \log(ex))^{-1}$

<div align="center">OR</div>

2. If $z = xy f(y/x)$, show that $x\dfrac{\partial z}{\partial x} + y\dfrac{\partial z}{\partial y} = 2z$ and if z is a constant then $\dfrac{f'(y/x)}{f(y/x)} = \dfrac{x(y + x\frac{dy}{dx})}{y(y - x\frac{dy}{dx})}$

3. Expand the function $f(x, y) = x^2 + xy - y^2$, by Taylor's theorem in power of $(x - 1)$ and $(y + 2)$.

<div align="center">OR</div>

4. Find a point within a triangle such that the sum of the squares of its distances from the three vertices is a minimum.

5. Apply Newton's formula to find the radius of curvature at the origin for the cycloid $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$.

<div align="center">OR</div>

6. Find the evolute of parabola $y^2 = 4ax$.

7. Find the length of the arc of the curve $y = \log(\sec x)$ from $x = 0$ to $x = \pi/3$.

<div align="center">OR</div>

8. Find the volume of the solids obtained by revolving the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ about the axis of X.

SECTION-B

II. Answer any <u>FOUR</u>   4 x 5 = 20 M

9. If $u = \sin^{-1}\left(\dfrac{x^2 + y^2}{x + y}\right)$, prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = \tan u$.

10. Verify Euler's theorem for $z = ax^2 + 2hxy + by^2$.

11. If $H = f(y - z, z - x, x - y)$, prove that $\dfrac{\partial H}{\partial x} + \dfrac{\partial H}{\partial y} + \dfrac{\partial H}{\partial z} = 0$.

12. Find $\dfrac{ds}{dt}$ given that $x = ae^t \sin t, y = ae^t \cos t$.

13. Find the radius and centre of curvature of $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$.

14. Find the perimeter of the cardioid $r = a(1 - \cos\theta)$.

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DIFFERENTIAL AND INTEGRAL CALCULUS

PRACTICAL

Programme : B.SC	**Max. Hours** : 30
Course Code : U24/MAT/DSC/101/P	**Hours per week** : 2
Course Type : DSC I	**Max. Marks** : 50
No. Of Credits : 1	

Course Outcomes:

CO 1: Solve problems on differentiation and integration of functions of two variables.

CO 2: Calculate the extreme values, radius of curvature, lengths of Curves, volumes of surfaces of revolutions.

PRACTICAL SESSIONS

1. Limits and Continuity of Functions of two Variables.
2. Partial Derivatives.
3. Homogeneous Function.
4. Maxima and minima of functions of two Variables.
5. Lagrange's Method of Multipliers.
6. Radius of Curvature.
7. Centre of Curvature, Chord of Curvature.
8. Evolutes and Involutes.
9. Lengths of Plane Curves.
10. Volumes and Surfaces of Revolution.

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DIFFERENTIAL AND INTEGRAL CALCULUS

MODEL QUESTION PAPER
PRACTICAL

Course Code: U24/MAT/DSC/101/P

No. Of Credits: 1

Max. Marks : 30

Time: 2 Hrs

I. Answer any <u>SIX</u>

$6 \times 5 = 30$ M

1. (a) Show that $\lim_{(x,y) \to (-1,2)} (x^3 + y^3 / x^2 + y^2) = 7/5$.

   (b) Show that $\lim_{(x,) \to (1,2)} (3x + 2y) = 7$.

2. If $z = f(x+ay) + \emptyset(x-ay)$ then prove that $\partial^2 z / \partial y^2 = a^2 \partial^2 Z / \partial x^2$.

3. Verify Euler's theorem for (i) $Z = ax^2 + 2hxy + by^2$ (ii) $Z = (x^2 + xy + y^2)^{-1}$.

4. Find the radius of curvature for the curve $r = a(1-\cos\theta)$.

5. Find the co-ordinates of the centre of curvature at a point (x, y) of the parabola $y^2 = 4ax$.

6. Find the length of the arc of the curve $y = \log(\sec x)$ from x=0 to x=$\pi/3$.

7. Find the evolute of parabola $y^2 = 4ax$.

8. Find the volume generated by revolution of an arc of the catenary $y = c \cos h(x/c)$ about the axis of X between x=a and x=b.

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SEMESTER - I
MICRO ECONOMICS

1. Course Description

Programme: BA   Max. Hours:60
Course Code: U24/ECO/DSC/101   Hours per week :4
Course Type: DSC   Max Marks : 100
No. of credits: 4

2. Course Objectives

- To Study the basic principles in Microeconomic theory

- To Learn the practical application of the theory

3. Course Outcomes

On completion of the course the student will be able to:

CO1   Understand the basic concept of micro economics (understand)

CO2   Apply economic theories and understanding consumer behaviour (Apply)

CO3   Evaluate production theory with the help of graphical representation (Evaluate)

CO4   Analyse cost and revenue concepts under different markets (Analyse)

4. Course Content

MODULE I: Basic concepts   **13 Hours**

1. Problem of scarcity and choice: scarcity, choice and opportunity cost; positive and normative production possibility frontier.
2. Demand: Determinants of demand, law of demand, shifts of demand versus movements along a demand curve, market demand,
3. Supply - law of supply, determinants of supply, shifts of supply versus movements along a supply curve, market supply and market equilibrium:
4. Elasticity: price elasticity of demand, determinants of price
   Elasticity, income and cross elasticity.

MODULE II – Theory of consumer behaviour   **17 Hours**

1. Cardinal utility analysis- introduction and assumptions of cardinal utility analysis, total utility and marginal utility

2. Law of diminishing marginal utility and equi - marginal utility

3. Consumer surplus- Marshals and Hick's analysis

4. Indifference curve analysis- introduction, properties/ assumptions of IC, diminishing marginal of substitution, budget line, consumers equilibrium under IC analysis,price, income and substitution effects.

MODULE III -Production Theory   **15 Hours**

1. Production functions: single variable - average and marginal product, law of variable proportions
2. Two variables - isoquants, properties of isoquants, producers' equilibrium, Law of returns to scale, Internal and external economies of scale

3. Different concepts of cost , Short Run cost curves, Long Run cost curve (LAC And LMC)

4. Concepts of Revenue – Total, average and marginal revenue, Relationship between AR and MR curves under perfect competition and imperfect competition

5. Break even analysis, Breakeven point and Profit Maximization.

MODULE IV – Pricing under different markets   **15 Hours**

1. Monopoly- characteristics, equilibrium, monopoly and inefficiency: social cost or dead weight loss,
2. Monopoly price discrimination –degrees, equilibrium of monopoly under price discrimination.
3. Monopolistic competition – characteristic features, Short Run & Long Run price and output determination, excess capacity
4. Oligopoly – characteristics of, reasons for price rigidity in non-collusive oligopoly, kinked demand curve
5. Duopoly - Cournot's model of duopoly.

5. References:

1. Ahuja H. L,*Micro Economics*, S. Chand and company Ltd, 2014, , New Delhi
2. Agarwal H. S, *Principles of economics*, Global Professional Publishing Ltd, 2013
3. Baumol, W.J, *Economic Theory and Operations Analysis*, Prentice Hall.,1985
4. Chopra P. N. *Advanced Economic Theory*, Kalyani Publications, 2011
5. Gregory Manikiw. N. *Principles of Micro Economics*, South-Western College Pub; 7th edition 2014
6. Henderson, J. and R.A. Quandt, *Microeconomic Theory*, McGraw Hill, Tokyo1984
7. Jhingan M. L.,*Micro Economic Theory*, Vrinda Publications, 2014
8. Koutsoyiannis A., *Modern Micro Economics*, Palgrave Macmillan U.K, 2003
9. Dr.Mithani D. M. Managerial economics, Himalaya publishing House 2011.
10. Libby Rittenberg and Timothy Tregarthen, *Principles of Micro Economics*, Flat World Knowledge, Inc. (2009)

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6.Syllabus Focus

a) Relevance to Local ,Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	The Course will Examine Demand and Supply in different markets and understand the behaviour of produces and consumers

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
EMP	Module I	Case Study
SD	Module 4	Presentation

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar Presentation	Participative Learning
2.	Quiz	Experiential Learning
3.	Group Discussion	Participative Learning

8. Course Assessment Plan

a) Weight age of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 Presentation	
CO4	CIA-2 Assignment	

MODEL QUESTION PAPER

Micro Economics

SECTION A - INTERNAL CHOICE   4 Q X 10 M = 40 M

Question Number	Question	Question	CO	BTL(Blooms Taxonomy Level)
1	Module 1	Analyze the law of demand, determinants of demand and shifts of demand	CO 1	BL 2
2	Module 1	Illustrate with an example the types of Price Elasticity of Demand	CO 1	BL 2
3	Module 2	Critically evaluate the law of Equi marginal utility	CO 2	BL 4
4	Module 2	Analyze consumer's equilibrium with help of indifference curve.	CO 2	BL 4
5	Module 3	Explain how a Long Run Average cost curve is derived	CO 3	BL 2
6	Module 3	Differentiate the Relationship between AR and MR curves under perfect competition and imperfect competition	CO 3	BL 2
7	Module 4	Explain Cournot's model of duopoly	CO 4	BL 2
8	Module 4	Explain price rigidity in oligopoly with the help of Kinky demand curve approach?	CO 4	BL 2

SECTION B - ANSWER ANY 4 OUT OF 6   4 Q X 5 M = 20 M
(To compulsorily have **ONE** question from **each** module)

9	Module 1	Income Elasticity of Demand	CO 1	BL 1
10	Module 2	Substitution effect	CO 2	BL 1
11	Module 2	Properties of indifference Curves	CO 2	BL 1
12	Module 3	TVC, TFC, TC	CO 3	BL 1
13	Module 3	Break Even Analysis	CO 3	BL 1
14	Module 4	Short run in Monopolistic competition	CO 4	BL 1

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