SEMESTER I

ENVIRONMENTAL STUDIES

1. Course Description

Program: BSC
Course Code: U24/EVS/AECC/101
Course Type: AECC
No. of credits: 2

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

2. Course Objectives:

- To Understand the principles of ecology and environmental issues
- To acquire the skills needed and develop a sense of responsibility to actively participate in its protection and improvement

3. Course Outcomes:

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

CO 1: Gain knowledge and develop in-depth understanding of the basics of ecological principles, conservation of biodiversity, renewable energy resources and water conservation

CO 2: Enhanced analytical capability to undertake and participate in finding solutions for various environmental issues and concerns of national and global importance to achieve environmental protection and sustainable development

DEPARTMENT OF ENVIRONMENTAL STUDIES   ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD

CHAIR PERSON B.O.S
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Begumpet,Hyderabad-16

4. COURSE CONTENT

UNIT - I: Ecosystem, Biodiversity & Natural Resources (15 hrs.)

1. Definition, Scope & Importance of Environmental Studies
2. Structure of Ecosystem – Abiotic & Biotic Components, Ecological Pyramids
3. Definition of Biodiversity, Genetic, Species & Ecosystem Diversity, IUCN Red list, Hotspots of Biodiversity, Threats and Conservation of Biodiversity (*Insitu & Exsitu*)
4. Renewable Energy Resources – Solar, Wind and Biomass
5. Water Conservation, Water Footprint, Rain Water Harvesting
6. Environmental Ethics

UNIT – II: Environmental Pollution, Global Issues & Legislation (15 hrs.)

1. Causes, Effects and Control Measures of Air and Water Pollution
2. Solid and Plastic Waste Management, Zero Waste Management
3. Global Warming & Ozone Layer Depletion, Carbon Footprint
4. Environmental Laws and Acts-Wildlife Protection Act, Forest Act, Air Act, Water Act
5. People's Participation in Environmental Protection- Silent Valley, Bishnois of Rajasthan
6. Disaster Management-Flood, Earthquake and Cyclones
7. Environmental Management
8. Role of Information Technology in Environmental Protection and Health

Field visit:

1. Visit to Solar Plant in your Locality/City
2. A Glimpse of Biodiversity in Hyderabad/ Visit to National Parks and a Walk-Through Campus
3. Visit to a Nearby Lake

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5. REFERENCES:

Books:

- Text book of Environmental Studies for undergraduate courses (second edition) by Erach Bharucha
- Environmental Studies by Dr. J.P. Sharma
- Perspectives in Environmental Studies – Anubha Kaushik & C.P. Kaushik
- A text book of Environmental Studies by Dr. D. K. Asthana and Dr. Meera Asthana
- Environmental Science by Dr. Syeda Azeem Unnisa

Magazines:

- **Terra Green (a monthly digital magazine on environmental issues)**
- Down to Earth, Centre for Science &
- Environment Survey of the Environment published by The Hindu

E-Resources:
- https://www.cseindia.org/
- https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf

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6. Syllabus Focus

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

Local /Regional/ National /Global Development Needs	Relevance
Local needs	Develop a critical understanding of Environmental issues and concerns. Inculcate the environmental ethics and work for sustainable future Utilise the potential application of Methods of Solid Waste Management in the Waste management concerns Involve in community development through extension and organising programs.
Regional needs	Creates awareness on pollution and threats to biodiversity in the Ecosystem
National needs	Have an over view of mitigation measures of disaster management. Explain major conservation strategies taken in India. Apply the Knowledge of role of information technology in protection of the environment.
Global needs	Environmental studies is globally relevant to monitor environmental issues and for the sustainable development. It deals with issues and challenges of environment management in the changing climate scenario.

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b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development, Entrepreneurship Development, Employability	Unit II Solid Waste Management	Demonstration of Composting, Vermicomposting and the preparation of Bio-Enzymes. Awareness on scope of green entrepreneurship and employability related to Solid waste management

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential learning	Field trips, Documentary watching, Demonstrations, Student volunteering days, Plantation drives, Clean up drives
2.	Participative Learning	Seminars, Workshops, Guest lectures, Group Discussion, Library reference, Presentations and Competitions, Demonstrations by students
3.	Problem Solving	Case Studies, Projects

8. Course Assessment Plan

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

CO	Internal Assessments IA -40%	End Semester Examination-60%
CO1	Field Visit report/Case Study/ Poster making/ Presentations/Eco Friendly product making/Model making	Written Exam
CO2		

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b) Model Question Paper- End Semester Exam

ENVIRONMENTAL STUIDES

Course Code: U24/EVS/AECC/101

Time: 1 Hour   **Max. Marks: 30**
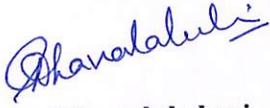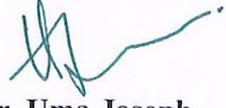
Answer any five of the following: **5X6=30**

1. Define environmental studies and mention the importance of environmental studies.
2. "Biomass is an important source of energy", Discuss.
3. Explain the rooftop rainwater harvesting system with the help of a diagram.
4. Identify the reasons for water pollution in your region and suggest measures to reduce the water pollution.
5. Discover the initiatives taken by swachh cities in solid waste management.
6. Comment on "Silent Valley- A people's movement that saved a forest."
7. List out the changes you would make in your lifestyle to reduce your carbon footprint.

c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks
I	15	CO 1	3	6
II	15	CO 2	4	6

Prepared by	Checked & Verified by	Approved by
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SEMESTER II

ENVIRONMENTAL STUDIES

6. Course Description

Program: BA, BMS & BCOM
Course Code: U24/EVS/AECC/201
Course Type: AECC
No. of credits: 2

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

7. Course Objectives:

- To Understand the principles of ecology and environmental issues
- To acquire the skills needed and develop a sense of responsibility to actively participate in its protection and improvement

8. Course Outcomes:

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

CO 1: Gain knowledge and develop in-depth understanding of the basics of ecological principles, conservation of biodiversity, renewable energy resources and water conservation

CO 2: Enhanced analytical capability to undertake and participate in finding solutions for various environmental issues and concerns of national and global importance to achieve environmental protection and sustainable development

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9. COURSE CONTENT

UNIT - I: Ecosystem, Biodiversity & Natural Resources (15 hrs.)

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2. Structure of Ecosystem – Abiotic & Biotic Components, Ecological Pyramids
3. Definition of Biodiversity, Genetic, Species & Ecosystem Diversity, IUCN Red list, Hotspots of Biodiversity, Threats and Conservation of Biodiversity (*Insitu & Exsitu*)
4. Renewable Energy Resources – Solar, Wind and Biomass
5. Water Conservation, Water Footprint, Rain Water Harvesting
6. Environmental Ethics

UNIT – II: Environmental Pollution, Global Issues & Legislation (15 hrs.)

1. Causes, Effects and Control Measures of Air and Water Pollution
2. Solid and Plastic Waste Management, Zero Waste Management
3. Global Warming & Ozone Layer Depletion, Carbon Footprint
4. Environmental Laws and Acts-Wildlife Protection Act, Forest Act, Air Act, Water Act
5. People's Participation in Environmental Protection- Silent Valley, Bishnois of Rajasthan
6. Disaster Management-Flood, Earthquake and Cyclones
7. Environmental Management
8. Role of Information Technology in Environmental Protection and Health

Field visit:

1. Visit to Solar Plant in your Locality/City
2. A Glimpse of Biodiversity in Hyderabad/ Visit to National Parks and a Walk-Through Campus
3. Visit to a Nearby Lake

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6. Syllabus Focus

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

Local /Regional/ National /Global Development Needs	Relevance
Local needs	Develop a critical understanding of Environmental issues and concerns. Inculcate the environmental ethics and work for sustainable future Utilise the potential application of Methods of Solid Waste Management in the Waste management concerns Involve in community development through extension and organising programs.
Regional needs	Creates awareness on pollution and threats to biodiversity in the Ecosystem
National needs	Have an over view of mitigation measures of disaster management. Explain major conservation strategies taken in India. Apply the Knowledge of role of information technology in protection of the environment.
Global needs	Environmental studies is globally relevant to monitor environmental issues and for the sustainable development. It deals with issues and challenges of environment management in the changing climate scenario.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development, Entrepreneurship Development, Employability	Unit II Solid Waste Management	Demonstration of Composting, Vermicomposting and the preparation of Bio-Enzymes. Awareness on scope of green entrepreneurship and employability related to Solid waste management

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential learning	Field trips, Documentary watching, Demonstrations, Student volunteering days, Plantation drives, Clean up drives
2.	Participative Learning	Seminars, Workshops, Guest lectures, Group Discussion, Library reference, Presentations and Competitions, Demonstrations by students
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8. Course Assessment Plan

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

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CO2		

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b) Model Question Paper- End Semester Exam

ENVIRONMENTAL STUIDES

Course Code: U24/EVS/AECC/201

Time: 1 Hour   **Max. Marks: 30**

Answer any five of the following: **5X6=30**

1. Define environmental studies and mention the importance of environmental studies.
2. "Biomass is an important source of energy", Discuss.
3. Explain the rooftop rainwater harvesting system with the help of a diagram.
4. Identify the reasons for water pollution in your region and suggest measures to reduce the water pollution.
5. Discover the initiatives taken by swachh cities in solid waste management.
6. Comment on "Silent Valley- A people's movement that saved a forest."
7. List out the changes you would make in your lifestyle to reduce your carbon footprint.

c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks
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II	15	CO 2	4	6

Prepared by	Checked & Verified by	Approved by
(signature) G. Dhanalakshmi Head, Dept. of Environmental Studies	*(signature)* G. Dhanalakshmi, Head, Dept. of Environmental Studies	*(signature)* Dr. Uma Joseph Principal

(signature) CHAIR PERSON B.O.S. in Environmental Science University College of Science Osmania University Hyderabad-500 007.

(signature) Head Dept.of Environmental Studies St.Francis College for Women (Autonomous) Begumpet,Hyderabad-16

SEMESTER - II

DATA ANALYSIS IN ECONOMICS

1. Course Description

Programme: BA   Max. Hours:30

Course Code: U24/ECO/DSC/201/P   Hours per week:2

Course Type: DSC   Max. Marks:50

No. of credits: 1

2. Course Objectives

To understand the practical applicability and calculation of various macroeconomic concepts

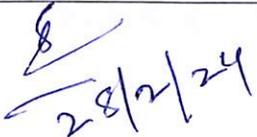### 3. Course Outcomes

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

CO1: Calculate the National Income and the concepts of Real and Nominal GDP

CO2: Evaluate the performance of the Economy bases on Inflation

CO3: Analyse the occupational distribution of India

4. Course Content

- National income, concepts , methods, circular flow of income, national income accounting,
- Real GDP , Nominal GDP, GDP deflator , National Income in Current prices and Constant prices
- Consumption function, Investment function, Equilibrium income
- Accelerator and Multiplier
- ex ante and ex post
- Inflation - basket of commodities
- Fiscal Deficit
- National Income Through Occupational Distribution/sectoral Contribution of growth (GDP) India and Telangana

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

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SEMESTER - II

1. Course Description

Programme : B.Sc
Course Code : U24/MAT/DSC/201
Course Type : DSC II
No. of credits : 4

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

2. Course Objectives

- To develop the ability to solve various types of differential equations using analytical methods

- To explore applications of differential equations in areas Growth and Decay, Dynamics of Tumour growth, Radioactivity and Carbon Dating, Compound Interest, Biological Growth, Epidemiology, Orthogonal Trajectories.

3. Course Outcomes

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

CO1: Classify different types of exact and non exact differential equations (**CLASSIFY**)

CO2: Discuss methods to obtain solutions for the first order but not of the first-degree differential equations and the applications of differential equations in various fields (**DISCUSS**)

CO3: Apply various methods for solving higher order linear differential equations with constant coefficients (**APPLY**)

CO4: Evaluate higher order of differential equations with non constant coefficient and Systems of Linear Differential Equations (**EVALUATE**)

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4. Course Content

MODULE I: (15 Hrs)

DIFFERENTIAL EQUATIONS OF FIRST ORDER & FIRST DEGREE:

Introduction, Equations in which Variables are Separable, Homogeneous Differential Equations, Differential Equations reducible to Homogeneous Form, Linear Differential Equations, Differential Equations reducible to Linear Form, Exact Differential Equations, Integrating Factors, Change in variables.

Sections: - 2.1- 2.9, Pg No. 27-56, 60-62

MODULE II: (15 Hrs)

DIFFERENTIAL EQUATIONS OF THE FIRST ORDER BUT NOT OF THE FIRST DEGREE:

Equations solvable for p, y, x, that do not contain x or y, Homogeneous in x & y, Equations of the first degree in x & y, Clairaut's Equation.

Sections: 3.1- 3.2.5, Pg. No.63-74

APPLICATIONS OF FIRST ORDER DIFFERENTIAL EQUATIONS:

Growth and Decay, Dynamics of Tumour growth, Radioactivity and Carbon Dating, Compound Interest, Biological Growth, A problem in Epidemiology, Orthogonal Trajectories

Sections: 4.1- 4.4, 4.8-4.9, 4.20, Pg. No. 75-84, 92-98, 133-140

MODULE III: (17 Hrs)

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS:

Introduction, Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of non-homogeneous linear differential equation with constant coefficients by means of polynomial operators:

1. When $Q(x) = b\,x^k$ and $P(D) = D - a_0$, $a_0 \neq 0$
2. When $Q(x) = b\,x^k$ and $P(D) = a_n D^n + a_{n-1} D^{n-1} + \ldots + a_1 D$
3. When $Q(x) = b\,e^{ax}$
4. When $Q(x) = b \sin ax$ or $b \cos ax$
5. When $Q(x) = e^{ax} V$, where V is a function of x
6. When $Q(x) = b e^{ax}$ & $P(a) = 0$
7. When $Q(x) = xV$ where V is any function of x

Method of Undetermined Coefficients, Method of Variation of Parameters.

Section: - 5.1-5.5, Pg. No. 159-190, 239- 241

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MODULE IV: (13 Hrs)

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS WITH NON-CONSTANT COEFFICIENTS:

Linear differential equations with non constant coefficients, The Cauchy Euler Equations, Legendre's Linear Equation.

Sections: - 5.6-5.8, Pg No. 190– 196, 241

SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS:

Definitions and Solution, Solution of a System of Linear Equations with Constant Coefficients, an Equivalent Triangular System, Degenerate Case, Compartment systems-Mixture Problems.

Sections: - 7.1-7.4, 7.10.1, Pg No. 311-320, 339-342, 365-366

5. References

1. Zafar Ahsan, Differential Equations & their Applications (Third Edition), Prentice Hall of India, Pvt. Ltd. New Delhi.
2. Rai Singhania, Ordinary & Partial Differential Equations, S. Chand & Co., New Delhi.
3. Richard Bronson, Differential Equations International Edition, Schaum's Outline Series.
4. V. Venkateshwara Rao, N. Krishna Murthy, B.V.S.S. Sarma, S. Anjaneya Sastry, The Text book of B.Sc. Mathematics, Revised edition of 2014 Volume 1, S.Chand and Co Private Ltd.
5. B. Sc First Year Mathematics, 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 help in predicting future behavior, optimizing processes, and solving real-world problems. Their applications range from understanding the motion of celestial bodies to modeling population growth and predicting the spread of diseases.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I: Differential Equations	Plotting a graph using Sage Math software
Employability	Module II: Applications of first order differential equations	Modelling of real-world problems
Skill Development	Module III: Higher order linear differential equations with constant coefficients	To pursue Higher Education

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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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b) Model Question Paper- End Semester Exam

DIFFERENTIAL EQUATIONS

Course Code: U24/MAT/DSC/201   Max. Marks :60M

No. of credits: 4   Time: 2Hrs

SECTION –A

I. **Answer the following.**   4 x 10=40M

1. Solve $xdx + ydy + \frac{xdy - ydx}{x^2 + y^2} = 0$.

OR

2. Solve $(1 + x)\frac{dy}{dx} - xy = 1 - x$.

3. A culture initially has N_0 number of bacteria. At $t = 1$ hr. the number of bacteria is measured to be $\left(\frac{3}{2}\right)N_0$. If the rate of growth is proportional to the number of bacteria present, determine the time necessary for the number of bacteria to triple.

OR

4. Solve $p^2 + 2pycotx = y^2$.

5. Solve $(D^3 + 2D^2 + D)y = x^2 + e^{2x} + x$.

OR

6. Using method of variation of parameters solve $y'' + 3y' + 2y = 12e^x$

7. Solve $x^2\left(\frac{d^2y}{dx^2}\right) + x\frac{dy}{dx} - 4y = x^2$.

OR

8. Solve the system $Dx - Dy = t, 4Dx - 4Dy = 4t$

SECTION –B

II. **Answer any FOUR:**   4x5=20 M

9. Solve $\frac{dy}{dx} = (x^2 + y^2 + 1)/2xy$.

10. Solve $y(1 - xy)dx - (1 + xy)xdy = 0$.

11. Solve $yzdx - 2xzdy + (xy - zy^3)dz = 0$.

12. Find the particular integral of $(D^2 - 3D + 2)y = x$.

13. Solve $(D^2 - 2D + 5)y = 0$ given that y=0 and $\frac{dy}{dx} = 4$ when x=0.

14. Solve $\frac{dx}{dt} = 2e^{2t}, \frac{dy}{dx} = \frac{x-y}{t}$

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DIFFERENTIAL EQUATIONS
PRACTICAL

Programme : B.Sc.   Max. Hours   : 30

Course Code : U24/MAT/DSC/201/P   Hours per week: 02

Course Type : DSC-2   Max. Marks   : 50

No. of credits : 01

Course Outcomes:

- Apply various methods to solve linear differential equations with constant coefficients.
- Solve linear equations with non-constant coefficients and Systems of Linear Differential Equations.

PRACTICAL SESSIONS

1. Linear and Bernoulli Differential Equations.

2. Exact Differential Equation and Integrating Factors – I.

3. Integrating Factors-II.

4. Equations Solvable for p and y.

5. Equations Solvable for x and Clairaut's Equations.

6. Applications of First Order Differential Equations.

7. Higher Order Linear Differential Equations.

8. Method of Undetermined Coefficients and Variation of Parameters.

9. Linear Differential Equations with non- constant coefficients, Cauchy Euler Equations, Legendre's Linear equations

10. Systems of Linear Differential Equations – Applications.

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CBCS 2024   **DIFFERENTIAL EQUATIONS**

MODEL QUESTION PAPER
PRACTICAL

Course Code: U24/MAT/DSC/201/P   **Max. Marks: 30**

No. Of Credits: 1   **Time: 2 Hrs**

I.   **Answer the following:**   **5 x 6 = 30 M**

1. Solve $\frac{dy}{dx} = \frac{\sin^2 x}{1+x^3} - \frac{3x^2}{1+x^3} y$

   OR

2. Solve $y\sin 2x\, dx - (1 + y^2 + \cos^2 x)dy = 0$

3. Solve $(3x^2 y^4 + 2xy)dx + (2x^3 y^3 - x^2)dy = 0$

   OR

4. Solve $y + px = p^2 x^4$

5. Solve $xy(y - px) = x + py$ by reducing it to Clairaut's form by using the substitution $x^2 = X, y^2 = Y$

   OR

6. If $Rs.\, 10,000$ is invested at 6 percent per annum, find what amount has accumulated after 6 years if interest is compounded: (a) annually, (b) quarterly, and (c) continuously.

7. Find particular integral of $y'' + 3y' + 2y = 8 + 6e^x + 2\sin x$

   OR

8. Solve the following differential equations by the method of variation of parameters.
   $y'' + 2y' + y = x^2 e^{-x}$

9. Solve $(2x + 3)^2 \frac{d^2 y}{dx^2} - 2(2x + 3)\frac{dy}{dx} - 12y = 6x.$

   OR

10. Solve $2\frac{dx}{dt} - x + \frac{dy}{dt} + 4y = 1, \frac{dx}{dt} - \frac{dy}{dt} = t - 1$

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DEPARTMENT OF MATHEMATICS, ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD.

SEMESTER - II

MACRO ECONOMIC THEORY

1. Course Description

Programme: BA

Course Code: U24/ECO/DSC/201

Course Type: DSC

No. of credits: 4

Max. Hours:60

Hours per week: 4

Max. Marks:100

2. Course Objectives

- To provide knowledge on various macroeconomic concepts
- To learn the theories of Consumption, Investment

3. Course Outcomes

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

CO1: Demonstrate knowledge in macroeconomic concepts (Understand)

CO2: Analyse the economic theories (Analyse)

CO3: Illustrate the working of IS and LM(Understand)

CO4: Examine the effects of inflation and deflation (Analyse)

4. Course Content

MODULE I: Introduction to Classical and Keynesian Theories of output Income and Employment   15 Hours

1. Macro Economics –meaning, definition and scope of macro economics
2. Say's law of markets, Pigou's wage flexibility
3. Keynesian theory – of income output and employment
4. Effective demand- aggregate demand and aggregate supply
5. Keynesian tools and underdeveloped countries

MODULE II: Consumption and Investment Functions   15 Hours

1. Consumption function-attributes, factors affecting and determinants of level of consumption in the short run
2. Keynes psychological law of consumption function.
3. Permanent, Relative and Life Cycle Hypothesis of consumption function
4. Investment function, types and factors affecting level of investment marginal efficiency of capital (MEC), marginal efficiency of investment (MEI).

MODULE III: Equilibrium in the IS -LM Model   15 Hours

1. Product market equilibrium IS curve
2. Money Market Equilibrium -LM curve
3. Two market equilibrium- product and money market.
4. Introduction of government in IS-LM Model

MODULE IV: Inflation & Unemployment   15 Hours

1. Inflation, Deflation and Stagflation: concept
2. Inflation - causes, effects and measures
3. Deflation - Causes, effects and measures
4. Inflation and unemployment- Philips's curve,

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5. References:

1. Branson, H.William Macroeconomics: *Theory and Policy*. AITBS Publishers 2006
2. Dornbusch, R. S. Fischer and Startz, *Macroeconomics*, Tata Mc-Graw Hill, 2004
3. Chopra P. N.*Macro-Economic Theory*, Kalyani Publications, 2011
4. Froyen, Richard T: *Macroeconomics theories and policies*. Pearson 2005
5. Jhingan. M.L., *Macro Economic Theory*, Vrinda Publications, 2014
6. Rangarajan C, Principles *of Macro Economics*, Tata McGraw-Hill Education, 1979
7. Richard T Froyen, *Macro Economic Theory*, Prentice Hall, 2012
8. Shapiro, E: *"Macroeconomic Analysis"* Galgotia Publication,1996.
9. Seth M. L., Macro *Economics*, Lakshmi Narain Agarwal, 1995.
10. Surrey M J, *Macro Economic Themes*,Oxford University Press 1976
11. Vashi M. C. *Macro EconomicTheory*Vikas Publishing House , 2009

6.Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
National	The course will enable students to know the trends economy

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.	Case studies	Problem Solving
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	

b) Model Question Paper- End Semester Exam

MACRO ECONOMIC THEORY

SECTION A - INTERNAL CHOICE			4 Q X 10 M = 40 M	
Question Number	**Question**	**Question**	**CO**	**BTL(Blooms Taxonomy Level)**
1	Module 1	Explain Keynesian theory of income and employment	CO 1	BL 2
2	Module 1	Illustrate how Keynesian tools are used in underdeveloped countries	CO 1	BL 2
3	Module 2	Examine Keynes psychology law of Consumption	CO 2	BL 4
4	Module 2	Analyze Relative Income Hypothesis theory	CO 2	BL 4
5	Module 3	Explain the IS and LM model	CO 3	BL 2
6	Module 3	Analyze the role of Government in IS and LM	CO 3	BL 2
7	Module 4	Evaluate the effects and remedial measures of Inflation	CO 4	BL 2
8	Module 4	Explain Philips curve and its relationship with employment	CO 4	BL 2

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

9	**Module 1**	Explain Say's Law of Market	**CO 1**	BL 1
10	**Module 1**	Write about aggregate demand and aggregate supply	**CO 1**	BL 1
11	**Module 2**	Explain about the Life cycle Hypothesis theory of Consumption	**CO 2**	BL 1
12	**Module 2**	Write about MEC and MEI	**CO 2**	BL 1
13	**Module 3**	Write about product market equilibrium	**CO 3**	BL 1
14	**Module 4**	What ids Deflation, write about its measures	**CO 4**	BL 1

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CBCS 2024

SEMESTER - II

PROBABILITY DISTRIBUTIONS

- **Course Description**

  Programme: B.Sc   Max. Hours: 60

  Course Code: U24/STA/DSC/201   Hours per week: 4Hrs

  Course Type:DSC 2B   Max. Marks: 100

  No. of credits: '4

- **Course Objectives:**

At the end of this course students are expected to be able,

- To apply standard discrete probability distribution to different situations.

- To apply standard continuous probability distribution to different situations.

Course Outcomes :

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

CO 1: **Memorize** and **apply** important discrete distributions such as Binomial, Poisson and their interrelations

CO2 : **Understand** Negative binomial, Geometric and hyper geometric distributions and ability to **identify** standard discrete probability distributions to different situations.

CO 3 : **Understand** important continuous distributions such as Uniform and Normal and also the **ability to use** and **interpret** normal probability

CO 4 : **Memorize** Exponential, Gamma, Beta and Cauchy distributions and to also **state** their relations with other distributions

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4.Course Content:

MODULE-I: Discrete distributions-I
(15 HOURS)

Uniform and Bernoulli distributions: definitions, mean, variance and simple examples. Definition and derivation of probability mass functions of Binomial distribution, Poisson distribution, properties of these distributions: median, mode, m.g.f, c.g.f, p.g.f, c.f, and moments upto fourth order, reproductive property (wherever exists) and their real life applications. Poisson approximation to Binomial distribution.

MODULE-II : Discrete distributions-II:
(18 HOURS)

Negative binomial, Geometric distributions: Definitions and real life applications, properties of these distributions: m.g.f, c.g.f, p.g.f, c.f and moments upto fourth order, reproductive property (wherever exists), lack of memory property for Geometric distribution. Poisson approximation to Negative binomial distribution.Hyper-geometric distribution: definition, real life applications, derivation of probability function, mean, variance. Binomial approximation to Hyper-geometric distribution.

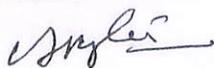### MODULE-III : Continuous distributions- I :
(15HOURS)

Rectangular and Normal distributions- definition, properties such as m.g.f, c.g.f, c.f and moments upto fourth order, reproductive property (wherever exists) and their real life applications.

MODULE-IV: Continuous distributions - II:
(12 HOURS)

Exponential, Gamma distributions- definition, properties: m.g.f, c.g.f, c.f and moments upto fourth order, reproductive property (wherever exists) and their real life applications. Beta distribution of two kinds: Definitions, mean and variance. Cauchy distribution- Definition and c.f. Pareto distribution: Mean and variance.

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5. References:

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

2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.

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

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

5. Sanjay Arora and Bansi Lal(2000):New mathematical Statistics: Satya Prakashan, New Delhi

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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	Discrete probability distributions find applications in various fields where outcomes are countable or finite. Coin tossing and dice rolling, bio statistics and epidemiology, queueing theory, reliability engineering, inventory management, finance and risk management, game theory.
	Continuous probability distributions are used in financial analysis, quality control, biometrics, reliability engineering, queuing theory, telecommunications, insurance and actuarial sciences, healthcare management, engineering.

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b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Probability distributions	Developing proficiency in probability distribution equips individuals with valuable analytical and modelling skill that are applicable across wide range of industries including finance, machine learning & data analysis, reliability analysis and more.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	MCQ test	Experiential learning
2.	Assignment	Experiential learning

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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)Question Paper Pattern

PROBABILITY DISTRIBUTIONS

THEORY

Course Code: U24/STA/DSC/201   Max. Marks: 60
Credits : 4   Time: 2 Hrs.

SECTION –A (Essay Questions)

I. Answer the following   **4x10=40Marks**

1. Derive the Cumulant generating function of Binomial Distribution. Using Cumulants find first four Central moments.

(OR)

2. Obtain the reccurence relation between the moments of Poisson Distribution . Hence Obtain Coefficient of Skewness and Kurtosis.

3. Define Negative Binomial Distribution .Show that Poisson distribution as a limiting case of Negative Binomial Distribution.

(OR)

4. Explain the situation and conditions where Hyper Geometric Distribution Occurs and give its pmf. Obtain Mean and Variance of Hyper Geometric Distribution.

5. Define Exponential distribution. State and prove lack of memory property of exponential distribution.

(OR)

6. Show that for Normal Distribution Mean=Median=Mode.

7. If X is a Gamma Variate with Parameter λ then obtain its m.g.f. Hence show that m.g.f of standard Gamma Variate tends to standard Normal Variate.

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(OR)

8. Define Beta Distribution of first kind. Hence obtain its first four central moments.

SECTION-B

II. Answer any FOUR   4x5=20

9. Define Bernoulli Distribution and find its Mean and Variance.

10. Derive the mode of poisson distribution.

11. State and prove lack of memory property of Geometric distribution.

12. Define Uniform Distribution on (a,b).Find its mean and variance.

13. Define Cauchy distribution. State and prove additive property of Cauchy distribution.

14. Define Pareto distribution. Derive its mean and variance.

c) Question Paper Blue print

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	5
2	18	CO-2	2	10	2	5
3	15	CO-3	2	10	2	5
4	12	CO-4	2	10	2	5

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SEMESTER II
PROBABILITY DISTRIBUTIONS PRACTICAL

1. Course Description

Programme : B.Sc
Course Code :U24/STA/DSC/201/P
Course Type: DSC 2B
No of Credits : 1

No of Hrs allotted: 2Hrs./Week
Max . Marks: 50

2. Course Outcomes:

1. **Apply** an appropriate distribution to discrete data.

2. **Interpret** normal, exponential and Cauchy distributions.

3. Course Content :

1. Fitting of Binomial distribution for n and $p=q=1/2$

2. Fitting of Binomial distribution –Recurrence Relation Method

3. Fitting of Poisson distribution –Direct Method

4. Fitting of Poisson distribution – Recurrence relation Method.

5. Fitting of Negative Binomial Distribution.

6. Fitting of Geometric distribution.

7. Fitting of Normal Distribution – Area Method.

8. Fitting of Normal Distribution – Ordinates Method.

9. Fitting of Exponential distribution.

10. Fitting of Cauchy distribution.

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a) Question Paper Pattern

PROBABILITY DISTRIBUTIONS

PRACTICAL

Course Code: U24/STA/DSC/201/P
Credits : 1

Max. Marks: 50(39+5+6)
Time: 2 Hrs.

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

1. The screws produced by a certain machine were checked by examining samples of 12.The following table shows the distribution of 128 samples according to the number of defective pieces recorded. Fit a Binomial distribution using recurrence relation.

No.of defective pieces	0	1	2	3	4	5	6	7	8	9	10	11	12
No.of samples	2	5	6	8	10	15	20	25	14	10	7	5	1

2. The number of ISD calls made from a telephone booth was tabulated on a day-wise basis as follows .Use the direct formula to fit a Poisson distribution .

No.of ISD calls	0	1	2	3	4	5	6	7
No.of samples	11	25	56	40	22	13	5	0

3. The waiting time X(in minutes) of a railway booking counter is exponentially distributed. The following data is obtained for 200 passengers.
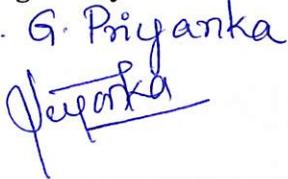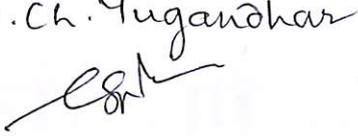
Waiting time	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No.of samples	2	5	6	8	10	15	20

4. Fit a normal distribution by AREAS method to the following data and find the expected

frequencies.

C.I	3-6	6-9	9-12	12-15	15-18	18-21	21-24	24-27	27-30
f	4	9	23	43	57	53	36	18	7

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 Ms. G. Priyanka	Name and Signature of HoD Dr. Ch. Yugandhar	Name and Signature of Principal