ANDHRA KESARI UNIVERSITY

Programme: B.A. Honours Mathematics (Major)

w.e.f. AY 2023-24 COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Fundamentals of Social Sciences	4	4
		2	Perspectives on Indian Society	4	4
	II	3	Differential Equations & Problem-Solving Sessions	5	4
		4	Analytical Solid Geometry & Problem Solving Sessions	5	4

SEMESTER-I

COURSE 1: FUNDAMENTALS OF SOCIAL SCIENCES

Theory Credits: 4 4 hrs/week

Learning objectives

The student will be able to understand the nature, various approaches, organs of the state, social perspectives and application of ICT.

Learning Outcomes: On successful completion of the course the student will be able to :

1. Learn about the nature and importance of social science.
2. Understand the Emergence of Culture and History
3. Know the psychological aspects of social behavior
4. Comprehend the nature of Polity and Economy
5. Knowledge on application of computer technology

Unit – I – What is Social Science?

1. Definition and Scope of Social Science – Different Social Sciences
2. Distinction between Natural Science and Social Sciences
3. Interdisciplinary Nature of Social Sciences
4. Methods and Approaches of Social Sciences

Unit – II – Emergence of Culture and History of India

1. Understanding Historical Evolution
2. Cultural Change through History
3. Evolution of Social Values
4. Modern Ethical Issues

Unit – III – Society and Social Behaviour

1. Definition, Nature and Scope of Psychology
2. Importance of Social Interaction
3. Need of Psychology for present Society
4. Thought process and Social behaviour

Unit – IV – Political Economy

1. Understanding Political Systems
2. Political Systems – Organs of State
3. Understanding over Economics
4. Economic Growth and Development

Unit - V – Essentials of Computer

1. Milestones of Computer Evolution - Computer – Block Diagram, Generations ofComputers
2. Internet Basics – Internet History, Internet Service Providers – Types of Networks – IP – Domain Name Services – Applications
3. Ethical and Social Implications – Network and Security concepts – Information assurancefundamentals
4. Cryptography – Symmetric and Asymmetric –malware – Fire walls – Fraud Techniques – Privacy and Data Protection

Reference Books

1. The social sciences: An Integrated Approach by James M. Henslin and Danniel F.Chambliss
2. The Wonder that was India – A.L.Bhasham
3. Introduction to Psychology – Morgan and King
4. Principles of Political Science – A.C. Kapoor
5. Contemporary Political Theory – J.C.Johari
6. M.L.Jhingan – Economic Development – Vikas, 2012
7. ML Seth – Macro Economics - Lakshminarayana Agarawal, 2015
8. Fundamentals of Computers by V. Raja Raman
9. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

Activities:

1. Group Project Work
2. PPT Presentation, Participation in Webinars
3. Field visits
4. Group Discussion
5. Survey and Analysis
6. Charts and Poster presentation
7. Identifying the attributes of network (Topology, service provider, IP address and bandwidth ofyour college network) and prepare a report covering network architecture.
8. Identify the types of malwares and required firewalls to provide security.
9. Latest Fraud techniques used by hackers.

SEMESTER-I

COURSE 2: PERSPECTIVES ON INDIAN SOCIETY

Theory Credits: 4 4 hrs/week

Learning objectives

The student is expected to demonstrate the significance of social sciences through better understanding of various fields of social experience and would be able to apply methods and approaches to social phenomena.

Learning Outcomes: On successful completion of the course the student will be able to :

1. Learn about the significance of human behavior and social dynamics.
2. Remembers the Indian Heritage and freedom struggle
3. Comprehend the philosophical foundations of Indian Constitution
4. Knowledge on Indian

EconomyUnit – 1 – Man in Society

1. Human Nature and Real Life Engagement
2. Social Groups and Social Dynamics
3. Individualism and Collectivism – Ethical Concerns
4. Human Life – Social Influence and Social

ImpactUnit – 2 – Freedom Struggle and Indian Heritage

1. Indian under British Rule
2. Raise of Nationalism (1857-1947)
3. Post-Independent India
4. Indian Heritage and

TourismUnit – 3 – Indian

Constitution

1. Philosophical Foundations of Indian Constitution
2. Elements of Indian Constitution
3. Study of Rights in Indian Constitution
4. Directive principles to State

Unit – 4 - Indian Economy

1. Contemporary Indian Economy – Sectoral Contribution of Income

2. Monetary and Fiscal Policies for Economic Development
3. Economic Reforms - Implementation in Public and Private Sectors
4. National and International Financial Resources

Unit – 5 - **Impact on Society & Analytics:**

1. Role of Computer, impact of Computers on human behavior, e-mail,
2. Social Networking- WhatsApp, Twitter, facebook, impact of Social Networks on human behavior.
3. Simulating, Modeling, and Planning, Managing Data, Graphing, Analyzing Quantitative Data,
4. Expert Systems and Artificial Intelligence Applications in the Social Sciences

References

1. Introduction to Psychology – Atkinson RC
2. History of the freedom movement in India – Tarachand
3. India since Independence – Bipinchandra
4. Introduction to the Constitution of India D.D.Basu
5. S.K Misra & V.K Puri – Indian Economy, Himalaya Publishing House , 2015
6. Government of India, Economic Survey (Annual), New Delhi
7. Information and Communication Technology by APCCE
8. Computer Applications in the Social Sciences by Edward E. Brent, Jr. and Ronald E. Anderson

Activities:

1. Assignment
2. PPT Presentation, Participation in Webinars
3. Field visits
4. Group Discussion
5. Survey and Analysis
6. Charts and Poster presentation
7. Identify the peripherals connected to a system and label them as either Input or Output or both.
8. Identify the Operating System loaded in your system and compare the features with otherexisting Operating System.
9. Collect latest census data and draw a graph indicating the growth rate.

1. Predicting the risk of depression, substance dependency, drinking, obsessive compulsivedisorders, and suicide using AI.

SEMESTER-II

COURSE 3: DIFFERENTIAL EQUATIONS

Theory Credits: 4 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. solve first order first degree linear differential equations.
2. convert a non-exact homogeneous equation to exact differential equation by using an integrating factor.
3. know the methods of finding solution of a differential equation of first order but not of first degree.
4. solve higher-order linear differential equations for both homogeneous and non-homogeneous, with constant coefficients.
5. understand and apply the appropriate methods for solving higher order differential equations.

Course Content

Unit – 1
Differential Equations of first order and first degree

Linear Differential Equations – Bernoulli's Equations - Exact Differential Equations –Integrating factors - Equations reducible to Exact Equations by Integrating Factors -

i) Inspection Method ii) $\frac{1}{Mx+Ny}$ iii) $\frac{1}{Mx-Ny}$

Unit – 2
Differential Equations of first order but not of first degree

Equations solvable for p, Equations solvable for y, Equations solvable for x – Clairaut's equation - Orthogonal Trajectories: Cartesian and Polar forms.

Unit – 3
Higher order linear differential equations

Solutions of homogeneous linear differential equations of order n with constant coefficients - Solutions of non-homogeneous linear differential equations with constant coefficients by means of polynomial operators

(i) $Q(x) = e^{ax}$ (ii) $Q(x) = Sin\ ax$ (or) $Cos\ ax$

Unit – 4
Higher order linear differential equations (continued.)

Solution to a non-homogeneous linear differential equation with constant coefficients

P.I. of $f(D)y = Q$ when $Q = bx^k$

P.I. of $f(D)y = Q$ when $Q = e^{ax}V$, where V is a function of x

P.I. of $f(D)y = Q$ when $Q = xV$, where V is a function of x

Unit – 5

Higher order linear differential equations with non-constant coefficients

Linear differential Equations with non-constant coefficients; Cauchy-Euler Equation; Legendre Equation; Method of variation of parameters

Activities

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving Sessions.

Text Book

Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd, New Delhi-Second edition.

Reference Books

1. Ordinary and Partial Differential Equations by Dr. M.D. Raisinghania, published by S. Chand &Company, New Delhi.
2. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
3. Differential Equations -Srinivas Vangala&Madhu Rajesh, published by Spectrum University Press.

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SEMESTER-II

COURSE 4: ANALYTICAL SOLID GEOMETRY

Theory Credits: 4 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. understand planes and system of planes
2. know the detailed idea of lines
3. understand spheres and their properties
4. know system of spheres and coaxial system of spheres
5. understand various types of cones

Course Content

Unit – 1
The Plane

Equation of plane in terms of its intercepts on the axis - Equations of the plane through the given points - Length of the perpendicular from a given point to a given plane - Bisectors of angles between two planes - Combined equation of two planes - Orthogonal projection on a plane.

Unit – 2
The Line

Equation of a line - Angle between a line and a plane - The condition that a given line may lie in a given plane - The condition that two given lines are coplanar - Number of arbitrary constants in the equations of straight line - Sets of conditions which determine a line - The shortest distance between two lines - The length and equations of the line of shortest distance between two straight lines - Length of the perpendicular from a given point to a given line.

Unit – 3
The Sphere

Definition and equation of the sphere - Equation of the sphere through four given points - Plane sections of a sphere - Intersection of two spheres - Equation of a circle - Sphere through a given circle - Intersection of a sphere and a line - Power of a point - Tangent plane - Plane of contact; Polar plane - Pole of a Plane - Conjugate points - Conjugate planes.

Unit – 4
Spheres (continued)

Angle of intersection of two spheres - Conditions for two spheres to be orthogonal - Radical plane; Coaxial system of spheres - Simplified from of the equation of two spheres.

Unit – 5
Cones

Definitions of a cone – vertex, guiding curve and generators - Equation of the cone with a given vertex and guiding curve - Equations of cones with vertex at origin are homogenous - Condition that the general equation of the second degree should represent a cone - Enveloping cone of a sphere - Right circular cone - Equation of the right circular cone with a given vertex, axis and semi vertical angle.

Activities

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving Sessions.

Text Book

Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, published by S. Chand & Company Ltd. 7th Edition.

Reference Books

1. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley Eastern Ltd., 1999.
2. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by TataMcGraw -Hill Publishers.
3. Solid Geometry by B. Rama Bhupal Reddy, published by Spectrum University Press.

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ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT

Single Major Programme from the Year 2023-24 Onwards

Programme-B.A. Mathematics Honours -Question Paper model,

First Year-Semester-I

Course 1 – Fundamentals of Social Sciences

Time: 3 Hours Total Marks: 75

Section –A

Answer any Five of the following Each Unit Must Carry Two Questions

5X5=25 Marks

1.

2.

3.

4.

5.

6.

7.

8.

9.

10

Section –B **5x10=50 Marks**

Answer any five of the following and Each unit must carry Two questions

11.

12.

13.

13.

14.

15.

16.

17.

18.

19.

20.

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT

Single Major Programme from the Year 2023-24 Onwards

Programme-B.A. Mathematics Honours -Question Paper model,

First Year-Semester-II

Course 2 – Perspectives of Indian Society

Time: 3 Hours Total Marks: 75

Section –A

Answer any Five of the following Each Unit Must Carry Two Questions

5X5=25 Marks

1.

2.

3.

4.

5.

6.

7.

8.

9.

10

Section –B **5x10=50 Marks**

Answer any five of the following and Each unit must carry Two questions

11.

12.

13.

13.

14.

15.

16.

17.

18.

19.

20.

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT
Single Major Programme from the Year 2023-24 Onwards
Programme-B.A. Mathematics Honours -Question Paper model,
First Year-Semester-II
Course3 – Differential Equations & Problem-Solving Sessions

Time: 3 Hours Total Marks: 75

PART –A

Answer any Five of the following

5X5=25 Marks

1.

2.

3.

4.

5.

6.

7.

8.

9.

10

PART –B

5x10=50

Answer all Five Questions. Each Question carries Ten Marks

11a.

Or

11b.

12a.

Or

12b.

13a.

Or

13b.

14a.

Or

14b.

15a.

Or

15b.

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT
Single Major Programme from the Year 2023-24 Onwards
Programme-B.A. Mathematics Honours -Question Paper model,
First Year-Semester-II
Course4 – Analytical Solid Geometry & Problem-Solving Sessions

Time: 3 Hours Total Marks: 75

PART –A

Answer any Five of the following

5X5=25 Marks

1.

2.

3.

4.

5.

6.

7.

8.

9.

10

PART –B

5x10=50

Answer all Five Questions. Each Question carries Ten Marks

11a.

Or

11b.

12a.

Or

12b.

13a.

Or

13b.

14a.

Or

14b.

15a.

Or

15b.