# SRI VENKATESWARA UNIVERSITY::TIRUPATI

## DEPARTMENT OF GEOLOGY

Master of Sciences:

**(With effect from 2024 - 2025)**

**The course of study and the scheme of Examinations**

**SEMESTER- III**

**SEMESTER-III**

| S. No | Course | Code | Title of the paper | Instruction hours per week | Credits | Internal assessment marks | End semester exam Marks | Total |
|---|---|---|---|---|---|---|---|---|
| 1 | | 301 | Mining Geology - 7 | 4 | 4 | 30 | 70 | 100 |
| 2 | Core | 302 | Remote Sensing and GIS – 8 (A) | 4 | 3 | 25 | 50 | 75 |
| | | | Digital Image Processing – 8 (B) | | | | | |
| 3 | | 303 | Economic Geology and Indian Mineral Deposits – 9 (A) | 4 | 3 | 25 | 50 | 75 |
| | | | Meteorology and Climatology – 9 (B) | | | | | |
| 4 | Practical - V | 304 | Remote Sensing and GIS – 8 (A) and Economic Geology and Indian Mineral Deposits – 9 (A) | 6 | 2 | 15 | 35 | 50 |
| 5 | SOC | 305 | Mineral Exploration and Ore Beneficiation – 5 (A) | 4 | 3 | 25 | 50 | 75 |
| | | | Dimensional Stones and Building Materials – 5 (B) | | | | | |
| 6 | | 306 | Water Resource Management – 6 (A) | 4 | 3 | 25 | 50 | 75 |
| | | | Environmental Geology -6 (B) | | | | | |
| 7 | Practical – VI | 307 | Mineral Exploration and Ore Beneficiation – 5 (A) and Water Resource Management – 6 (A) | 6 | 2 | 15 | 35 | 50 |
| 8 | OOTC OR (Open Elective) | 308 | Open Online Transdisciplinary Course – 2 OR **GEO:308 - FUEL GEOLOGY** | -- | 2 | 100 | 30 | 100 |
| * | Seminar/tutorials /Remedial Classes and Quiz as part of internal assessment. | | | 4 | -- | -- | -- | -- |
| | Total | | | **625** | **22** | **260** | **340** | **600** |

**OPEN ELECTIVE**
**GEO:308 - FUEL GEOLOGY**

**Course learning objectives:**

- To impart knowledge about the origin, composition and accumulation of petroleum; reservoir rock types and reservoir traps.
- To know geology of oil bearing basins of India, position of oil and gas in India and future prospects and economic scenario.
- To educate about the coal characteristics, geographical distribution of coal and detailed geology of coal fields of India.
- To enlighten about the occurrence and association of atomic minerals, methods of prospecting and Nuclear power stations country and future prospects.

**SYLLABUS**

UNIT- I:
Petroleum: Composition – nature - origin: inorganic and organic theories – migration (primary and secondary) and accumulation of oil and gas - Geographic locations - petroleum reservoir rocks - Reservoir rock types, Geological age of reservoir rocks - Reservoir traps - Classification of traps, anticlinal theory - Structural traps caused by folding, faulting and fracturing.

UNIT- II:
Primary stratigraphic traps - Fluid traps, Salt domes, Salt plugs, Cap rocks and association traps: Origin, reservoir conditions - Oil bearing basins of India - Geology of the productive oil fields of India - Position of oil and natural gas in India - Future prospects and economic scenario.

UNIT- III:
Coal: Definition, origin, sedimentology of coal bearing strata - Rank, grade and type of coal - Chemical characterization: Proximate and ultimate analysis - Coal forming epochs in the geologic past - Geological and geographical distribution of coal in India - Detailed geology for important coal fields in India.

UNIT- IV:
Atomic minerals: Mode of occurrence and association of atomic minerals in nature - Atomic minerals as source of energy - Methods of prospecting and productive geological horizons in India - Nuclear power stations of country and future prospects - Atomic fuels and environment.

**Textbooks/Reference Books:**


1. Taylor, G.H., Teichmueller, M., Davis, A., Diesel, C.F.K. and others, 1998: Organic Petrology, Berlin – Stuttgart.
2. Selley, R.C., 1985: Elements of Petroleum Geology, Academic Press
3. Chandra, D., Singh, R.M and Singh, M.P: Textbook of Coal
4. Singh, M.P: Coal and Organic Petrology
5. Stach, E, Mackowsky, M.T.H, Taylor, H.H and others, 1982: Stach's Textbook of Coal Petrology
6. Holson, G.D. and Tiratso, E.N., (1985): Introduction to Petroleum Geology. Gulf Publishing, Houston, Texas.
7. North, F.K., (1985): Petroleum Geology. Allen Unwin.
8. VBoyle, R.W., (1982): Geochemical prospecting for Thorium and Uranium deposits, Elsevier

**Course Outcomes:**

- After completion of the course, Students will be able to:
- Understand about natural fuels like coal and petroleum their formation and distribution especially in sedimentary basins.
- Analyze the formations, nomenclature in constitution of coal working detail of distribution of coals and coal industry in India, Sufficient idea of formation and entrapment of oil and gas.
- Discuss the occurrence of atomic minerals in nature, methods of prospecting, atomic fuels and environment.

**CO – PO Mapping:**

| POs → COs↓ | PO1 | PO2 | PO3 | PO4 | PO 5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | M | H | M | | | | | | | |
| CO2 | M | L | M | M | M | | | | | | | |
| CO3 | M | L | M | M | M | | | | | | | |
| CO4 | H | L | H | H | H | | | | | | | |

H: High; M: Medium; L: Low

| SEMESTER - IV | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S. No** | **Course** | **Code** | **Title of the Course** | **H/W** | **C** | **SEE** | **IA** | **Total Marks** |
| 1 | OOSDC<br>SDC | 401 | Open Online Skill Development Courses<br>(A) DIMENSIONAL STONES AND BUILDING MATERIALS<br>(B) WATERSHED MANAGEMENT | 4<br>4 | 4<br>4 | 100<br>100 | 30<br>30 | 100<br>100 |
| 2 | PW | 402 | Project Work – Orientation classes | 24 | 12 | 300 | 0 | 300 |
| * | Conducting classes for competitive exams, communication skills, UGC / CSIR and NET / SLET examinations | | | 12 | - | - | - | - |
| | | | **Total** | **36** | **20** | **300** | **200** | **500** |
| | | | | | | | | |
| **Total Semesters** | | | | **144** | **84** | **1320** | **880** | **2200** |

**SEMESTER- IV**

**Skill Development Course**

## GEO: 401(A) DIMENSIONAL STONES AND BUILDING MATERIALS

**Course learning objectives**

1. To introduce the knowledge on dimensional stones and construction materials
2. To classify dimensional stones and construction materials
3. To inquire suitability of the dimensional stones of construction materials

**Syllabus**

**UNIT- I**

Criteria for selection of dimensional stones – Importance of dimensional stones in archaeological monuments - Dimensional Stone: Indian Scenario – Granite Industry in India – Dimensional Stones through Geological Time Scale – Granite Trade in South India.

**UNIT – II**

Dimensional Stone Varieties – Characteristics of Dimensional stone –Distribution of Dimensional Stones in India –Distribution of Dimensional Stones in Andhra Pradesh – Export and Import Qualities.

**UNIT – III**

Construction Materials: Varieties of Construction Materials – Ornamental and Construction Materials in Indian History – Distribution of Building Materials in Andhra Pradesh – Conservation of Commercial Rock Deposits/Monumental/Building Stones

**UNIT – IV**

Engineering properties of rocks, Behavior of rock on application of stresses: Stress and its type; Strain and its type Application of Strain and stress curve; Mohr’s Circle and Stress Transformation.

**Textbooks/Reference Books:**


1. Blyth, F.G.H. and Defreites, M.A., 1984: A Geology for Engineers
2. Krynine, D.P. and Judd, W.R., 1957: Principles of Engineering Geology.
3. Bell, F.G., 1999: Geological Hazards, Routledge, London.
4. Vikram, K., 1986: Directory of Dimensional Stones.
5. Raman, P.K., Mineral Resources of Andhra Pradesh.
6. Information Dossier on Regional Evaluation of Dimension Stone Granite in Andhra Pradesh, 1999: Geological Survey of India, OPAP.


**Course Outcomes**

After completion of the course , Students will be able to:

1. Explain the distribution of dimensional stones and occurrence of construction materials
2. Classify dimensional stones and construction materials
3. Assess the suitability of various dimensional stones and construction materials

**CO – PO Mapping:**

| POs → COs↓ | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | M | H | M | | | | | | | |
| CO2 | M | L | M | M | M | | | | | | | |
| CO3 | M | L | M | M | M | | | | | | | |
| CO4 | H | L | H | H | H | | | | | | | |

H: High; M: Medium; L: Low

**Skill Development Course**

**Geo: 401 (B) WATERSHED MANAGEMENT**

**Course learning objectives**

1. To provide basics of watershed management
2. To apply the mitigation techniques of land erosion
3. To develop water harvesting techniques based on the terrain conditions
4. To implement the approach of people's participation in watershed management

**SYLLABUS**

**UNIT-I**

Objectives of watershed development - Characteristics of watershed – Principles of watershed – Effects of watershed on community – Delineating the watershed – Basic data on watersheds –Need for watershed development – Watershed development programmes in India – Watershed Atlas

**UNIT-II**

Types and Factors affecting erosion - Effects and control methods of erosion - Estimation of soil loss due to erosion - Universal soil loss equation –Degradation agents – Impact of the degradation of watersheds– Land use and land capability studies - Management of Agricultural, Forest, Grassland and wild land - Reclamation of saline and alkaline soils.

**UNIT-III**

Concept of Rainwater harvesting - water harvesting structures - Guidelines for construction of harvesting structures – Success stories of water harvesting structures –Role of peoples participation in construction and management of harvesting structures– Rain water harvesting from roof top

**UNIT-IV**

Elements of watershed management – Planning and Implementation of watershed Management activities – Multidisciplinary approach for watershed management – Impact of watershed Management.

**Textbooks/Reference Books:**

1. Rajora, R., (1998), Integrated Watershed Management, Rewat Publications, New Delhi.
2. Tideman, E.M., (1996): Watershed Management: Guidelines for Indian Conditions, Omega Scientific Publishers, New Delhi.
3. Lal. S., (2004), Watershed Development, Management and Technology, Mangal Deep Publications.
4. Paranjape, S. et. al., (1998), Watershed Based Development: A Source Book, Bharat Gyan Vigyan Samathi, New Delhi.
5. Suresh, R., (2002), Soil and Water Conservation Engineering, Standard Publishers and Distributers, Delhi.
6. Kakade, B.K., (2002), Soil and Water Conservation Structures in Watershed Development Programs, BAIF Development Research Foundation, Pune.

**Course Outcomes**

After completion of the course , Students will be able to:

1. Explain the importance of watershed management
2. Classify and explain the different water harvesting techniques
3. Use modern tools for land erosion control
4. Develop or improve the people's participatory approach for sustainable development and management of watersheds

**CO – PO Mapping:**

| POs → COs↓ | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | M | H | M | | | | | | | |
| CO2 | M | L | M | M | M | | | | | | | |
| CO3 | M | L | M | M | M | | | | | | | |
| CO4 | H | L | H | H | H | | | | | | | |

H: High; M: Medium; L: Low

**MODEL QUESTION PAPER**

(*Revised Syllabus w.e.f. 2024-2025 for Campus Students)*

**M.Sc. DEGREE EXAMINATION - 2025**

**THIRD SEMESTER**

**SUBJECT: GEOLOGY**

**OPEN EELCTIVE - PAPER VI – GEO.308: FUEL GEOLOGY**

**Time: 3 hrs** **Max. Marks: 70**

---

**SECTION – A**

***Answer any Five of the following questions. All questions carry equal marks 5 X 4M = 20 M***

1. Origin of Petroleum
2. Geographic locations of Petroleum
3. Origin of cap rocks
4. Salt domes
5. Hydrocarbon evaluation
6. Coal petrology
7. Radioactive minerals
8. Occurrence of atomic minerals

**SECTION – B**

***Answer ALL questions. All questions Carry equal Marks 4 x 12.5 = 50 M***

9. a) Write an essay on surface and subsurface occurrence of petroleum and gas

(OR)

b) Describe the migration and accumulation of oil and gas

10. a) Describe various types of stratigraphic traps with neat sketch

(OR)

b) Enumerate the geology of the oil fields in India

11. a) Write an essay on preparation of coal for industrial propose

(OR)

b) Discuss about Indian coal reserves and production of coal in India

12. a) Write a detailed note on Atomic fuels and environment

(OR)

b) Give an account of productive geological horizons of atomic minerals of India

**SEMESTER- IV**

## MODEL QUESTION PAPER

(*Revised Syllabus w.e.f. 2024-2025 for Campus Students)*

**M.Sc. DEGREE EXAMINATION - 2025**

**FOURTH SEMESTER**

**SUBJECT: GEOLOGY**

**PAPER V – GEO.401 (B) WATERSHED MANAGEMENT**

**Time: 3 hrs** **Max. Marks: 70**

---

### SECTION – A

***Answer any Five of the following questions. All questions carry equal marks 5 X 4M = 20 M***

1. Four objectives of Watershed management
2. Principle of watershed
3. Types of erosion
4. Control methods of erosion
5. Advantages of Rainwater harvesting structures
6. Types of harvesting structures
7. Elements of Watershed management
8. Impact of watershed management

### SECTION – B

**Answer ALL questions. All questions Carry equal Marks 4 x 12.5 = 50 M**

9. a) Discuss the Characteristics of watershed management

OR

b) Explain the importance of watershed management

10. a) What is a soil loss equation and discuss in detail

OR

b) List the degradation agents of watersheds.

11. a) Write the selection criteria of check dams with neat sketch

OR

b) Discuss the role of harvesting structures in groundwater resources

12. a) Discuss the significance of planning and implementation of watershed management

OR

b) Write the multidisciplinary approach of watershed management

**MODEL QUESTION PAPER**

(*Revised Syllabus w.e.f. 2024-2025 for Campus Students)*

**M.Sc. DEGREE EXAMINATION - 2025**

**FOURTH SEMESTER**

**SUBJECT: GEOLOGY**

**PAPER IV–GEO. 401 (A) DIMENSIONAL STONES AND BUILDING MATERIALS**

**Time: 3 hrs** **Max. Marks: 70**

---

## SECTION – A

***Answer any Five of the following questions. All questions carry equal marks 5 X 4M = 20M***

1. Meaning of Dimensional stones
2. Types of natural stones
3. Dimensional stones in Rayalaseema Region
4. Some examples of Dimensional stones
5. Conservation of commercial rock Deposits
6. Construction Materials
7. Stress and Strain in Rocks
8. Stress curve

## SECTION – B

**Answer ALL questions. All questions Carry equal Marks 4 x 12.5 = 50 M**

9. (a) Write an essay on criteria for selection of Dimensional stones.

Or

(b) Describe the importance of Dimensional stones Archaeological monuments.

10. (a) Briefly explain the various types of the Dimensional stones in Andhra Pradesh and Telangana

Or

(b) Write an essay on export and import qualities of Dimensional stones in India.

11. (a) Briefly explain the Ornamental and Construction materials in Indian History.

Or

(b) Distribution of Building Materials in Andhra Pradesh.

12. (a) Explain the Engineering Properties and Behaviour of the Rocks.

Or

(b) Write an essay on Mohr’s circle and Stress Transformation.