



SARDAR PATEL UNIVERSITY

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

Vallabh Vidyanagar

Gujarat

Academic Program Structure

&

Curriculum

(Aligned with NEP-2020)

[M.Sc. Earth Science]

NHEQF Level: 6.5

Entry NHEQF Level	:	5.5/6
Duration	:	Two Years (Four Semesters)
Total Courses	:	24
Total Learning Hours	:	2640
Total Credits	:	88
Total Marks	:	2200

Graduate Attributes (GAs):

GA1: Advanced Earth Science Knowledge

Demonstrate comprehensive and integrated knowledge of geology, geophysics, geochemistry, atmospheric science, oceanography, environmental science, and Earth system processes.

GA2: Critical and Scientific Thinking

Apply scientific reasoning, critical thinking, and analytical skills to investigate Earth-related phenomena, environmental issues, and geoscientific problems.

GA3: Research and Innovation Competency

Design, conduct, interpret, and communicate interdisciplinary research using advanced scientific methodologies, field techniques, laboratory analysis, and computational tools.

GA4: Problem Solving and Decision Making

Evaluate geological, environmental, climatic, and resource-related challenges and formulate scientifically sound and sustainable solutions.

GA5: Technical and Field Competency

Demonstrate proficiency in field investigations, geological mapping, remote sensing, GIS applications, geophysical instrumentation, and laboratory techniques.

GA6: Environmental and Sustainability Awareness

Assess environmental impacts, climate change issues, natural resource utilization, and sustainable development practices using scientific and ethical approaches.

GA7: Communication and Scientific Writing

Communicate scientific findings, technical information, and research outcomes effectively through reports, publications, presentations, and digital platforms.

GA8: Leadership and Teamwork

Function effectively as an individual, team member, and leader in multidisciplinary academic, industrial, environmental, and research environments.

GA9: Digital and Computational Literacy

Use advanced ICT tools, data analysis software, geospatial technologies, modeling techniques, and digital databases for Earth science applications.

GA10: Ethical and Professional Responsibility

Demonstrate professional ethics, scientific integrity, social responsibility, and adherence to environmental and constitutional values in professional practices.

GA11: Interdisciplinary Integration

Integrate concepts from physical sciences, environmental science, geography, engineering, and computational sciences to address complex Earth system problems.

GA12: Lifelong Learning and Professional Development

Engage in lifelong learning, adaptability, innovation, and professional development to address emerging trends in Earth science and environmental sustainability.

Programme Educational Objectives (PEOs):

PEO1:

To prepare graduates with advanced theoretical and practical knowledge in Earth science for careers in academia, research organizations, environmental agencies, industries, and government sectors.

PEO2:

To develop analytical, technical, research, and computational competencies for investigating geological, environmental, climatic, and geophysical problems.

PEO3:

To promote interdisciplinary research, innovation, and application-oriented learning in geosciences, environmental sustainability, and natural resource management.

PEO4:

To cultivate ethical values, scientific integrity, environmental responsibility, leadership qualities, and professional competence in Earth science practices.

PEO5:

To equip graduates with communication skills, digital literacy, field expertise, and scientific writing abilities for professional and research excellence.

PEO6:

To encourage lifelong learning, entrepreneurship, and continuous professional development for adapting to emerging scientific and technological advancements in Earth science.

Program Learning Outcomes (PLOs):

PLO1: Remember and explain advanced concepts, theories, terminologies, and processes related to geology, geophysics, geochemistry, climatology, hydrology, and environmental science.

PLO2: Apply scientific, mathematical, computational, and geospatial principles to investigate and solve Earth science and environmental problems.

PLO3: Analyze geological structures, Earth materials, climatic systems, environmental data, and geophysical observations using scientific and statistical approaches.

PLO4: Evaluate the environmental, economic, societal, and sustainability implications of natural resource utilization, climate change, and geoscientific activities.

PLO5: Design and develop research methodologies, field investigations, models, simulations, and experimental studies for Earth science applications.

PLO6: Conduct independent and collaborative research using appropriate field techniques, laboratory methods, literature review practices, and scientific data interpretation.

PLO7: Demonstrate competency in the use of advanced instrumentation, GIS, remote sensing tools, geophysical equipment, computational software, and modern analytical techniques.

PLO8: Interpret and communicate scientific findings, environmental assessments, and technical information effectively through reports, dissertations, publications, and presentations.

PLO9: Function effectively as a responsible individual, team member, and leader in multidisciplinary scientific, environmental, industrial, and research settings.

PLO10: Demonstrate ethical practices, scientific integrity, environmental awareness, and professional responsibility in Earth science research and applications.

PLO11: Assess natural hazards, environmental risks, climate-related challenges, and sustainable resource management strategies using scientific evidence and critical evaluation.

PLO12: Engage in lifelong learning, innovation, entrepreneurship, and continuous professional development to adapt to emerging advancements in Earth science and environmental technologies.

Program Specific Learning Outcomes (PSLOs):

PSLO1: -NA

PSLO2: -NA

PSLO3: -NA



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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

[M.Sc. Earth Science]

Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2T01NCEAS01	Elements of Physical Sciences	4-0-0	120	4	30	20	50	50	100
DSC	P2T01NCEAS02	Elements of Chemical Sciences	4-0-0	120	4	30	20	50	50	100
DSC	P2T01NCEAS03	Mathematical & Statistical Tools	4-0-0	120	4	30	20	50	50	100
DSC	P2T01NCEAS04	Practical based on PT01DSCES01 & PT01DSCES02	0-8-0	120	4	30	20	50	50	100
DSC	P2T01NCEAS05	Practical based on PT01DSCES03 & PT01DSCES06	0-8-0	120	4	30	20	50	50	100
DSC	P2T01NCEAS06	Planet Earth and its Subsystems	2-0-0	60	2	15	10	25	25	50
				600	22	165	110	275	275	550

DSC: Discipline Specific Core **DSE:** Discipline Specific Elective **L:** Lecture **P:** Practical **T:** Tutorial

FA: Formative Assessment **SA:** Summative Assessment



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Semester-II

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2T02NCEAS01	Synthesis & Properties of Materials	4-0-0	120	4	30	20	50	50	100
DSC	P2T02NCEAS02	Instrumentation	4-0-0	120	4	30	20	50	50	100
DSC	P2T02NCEAS03	Characterization Techniques	4-0-0	120	4	30	20	50	50	100
DSC	P2T02NCEAS04	Practical based on PT02DSCES01 & PT02DSCES03	0-8-0	120	4	30	20	50	50	100
DSC	P2T02NCEAS05	Practical based on PT02DSCES02 & PT02DSCES06	0-8-0	120	4	30	20	50	50	100
DSC	P2T02NCEAS06	Environmental Science, Health and Safety	2-0-0	60	2	15	10	25	25	50
				600	22	165	110	275	275	550

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