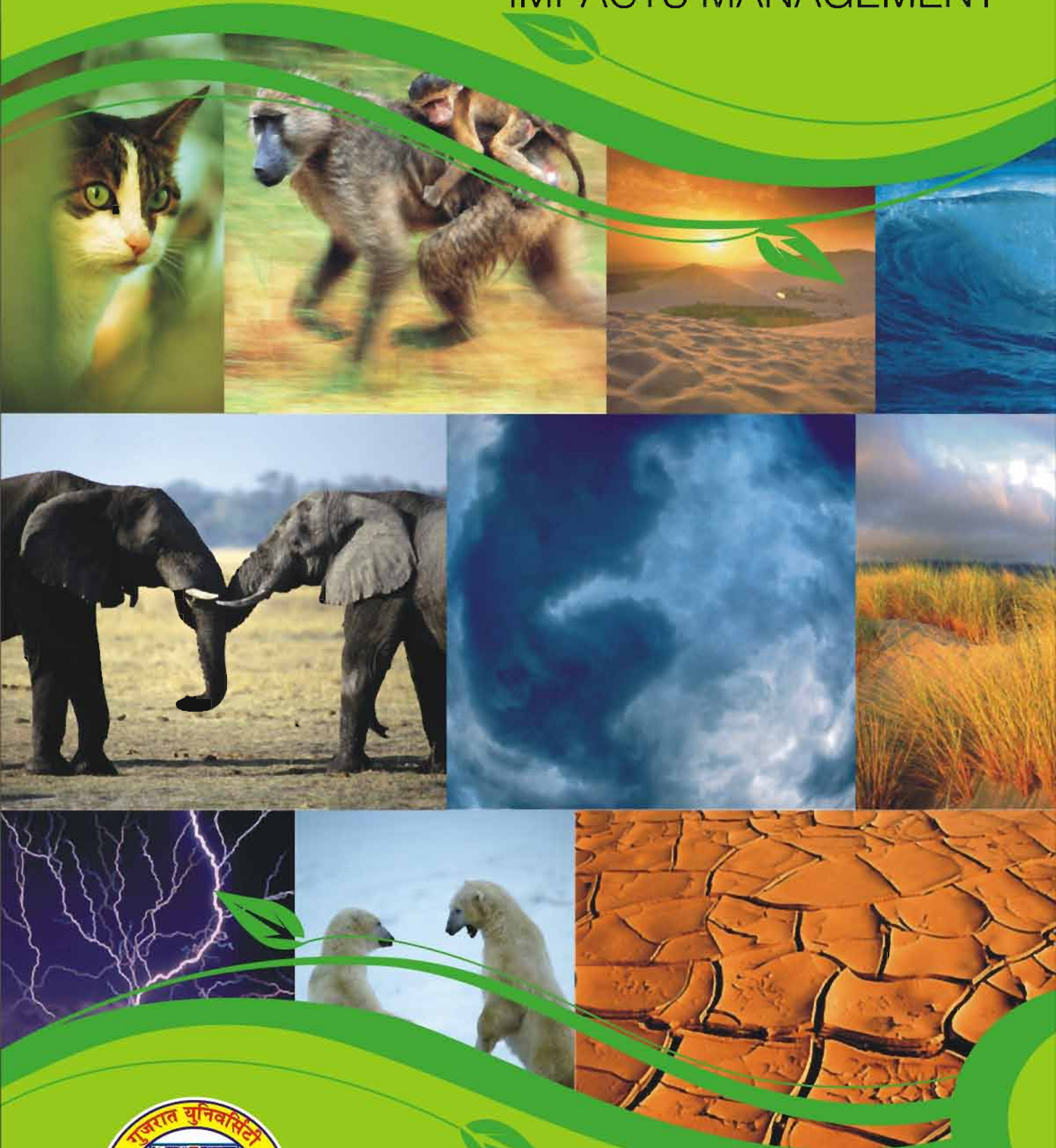


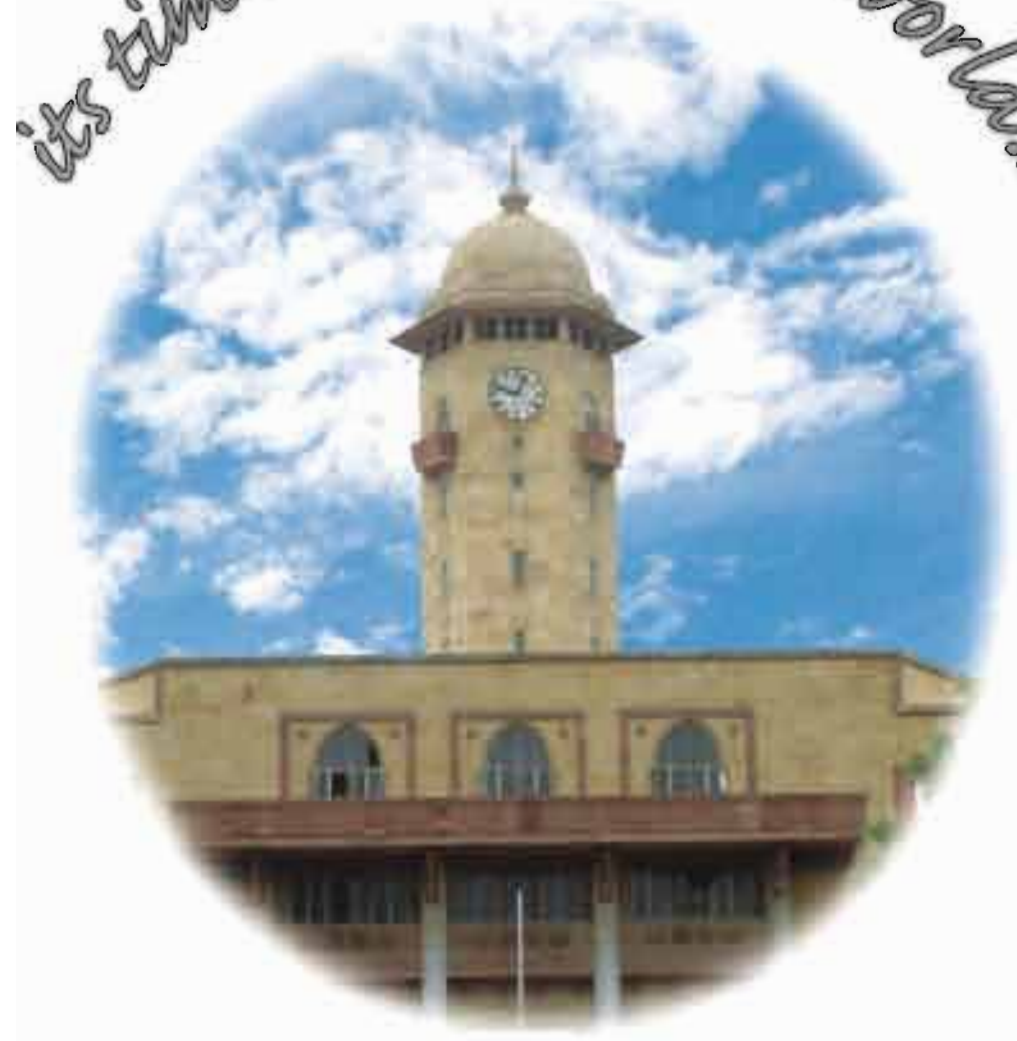
# M. Sc. in **CLIMATE CHANGE**

## IMPACTS MANAGEMENT



**GUJARAT UNIVERSITY, AHMEDABAD**

*its time to change the world...*



*a journey to greatness*

(B++ / 83.1%) NAAC Accreditation

**GUJARAT UNIVERSITY**  
**AHMEDABAD**

### **Shri Nawal Kishore Sharma**

His Excellency The Governor of Gujarat

I am glad to know that the University School of Sciences, Gujarat University, Ahmedabad in collaboration with the Centre for Environment Education, Ahmedabad is starting an innovative course - M. Sc. in Climate Change from this academic year 2009 - 2010.

I appreciate that the University is starting this innovative course which will give boost to the Climate Change Programme and its related activities including research work.

I convey my best wishes for starting this innovative course.



### **Shri Narendra Modi**

Honorable Chief Minister, Gujarat State

With global warming and the rise in temperatures of the earth many consequent changes in the climate have left their adverse effects in several sectors. It is necessary to counter these effects on economic progress and development. The issue of environment and climate change has been addressed to by our sages. In keeping with that thinking we need to focus on this area. Government of Gujarat has decided "in-principle" to create new administrative department for "Climate Change" to develop effective strategies in this field. Gujarat is the first state in the country and the fourth such category among the world creating such a separated department.

I am pleased to note that "Gujarat University" Ahmedabad is starting an Innovative course - "M. Sc. in Climate Change Impacts Management" from this academic year.

My warmest wishes to Prospectus of this Innovative course.



### **Shri Ramanlal Vora**

Honorable Education Minister, Gujarat State

Climate change is of great concern to the mankind. It refers to the variation in the earth's climate or regional climate over a long-term period. Such changes have impacts not only on the natural systems but also all living forms including human being. In fact, projection of climate models indicate that the negative impacts would be much more than the positive ones.

Our responsibility is to reduce vulnerability to such impacts by our knowledge and ability through understanding of underlying science, mechanism and mitigation strategies.

The initiative by the Gujarat University, to start such as an innovate course - M. Sc. in Climate Change impacts Management in partnership is commendable.

I convey best wishes for the course.



### **Dr. Parimal Trivedi**

Vice Chancellor, Gujarat University, Ahmedabad

Global climate is influenced by natural and manmade processes. In fact, human induced climate change is related to the use of fossil fuels as the emissions of carbon dioxide. Among the other major greenhouse gases, carbon dioxide has caused the largest atmospheric warming. The foremost effects of this would include shortages of water, food as well as greater risks to health and life.

The developing countries have an important role in the state of climate change. The initiative by our university in this direction is a bold step to control impacts of climate changes. I must compliment the members of CEE and university officers / teachers under the co-ordinationship of Dr. Yogesh T. Jasrai for great efforts.

The students from various discipline can take advantage of such a course to develop their capabilities in managing the climate change impacts and contribute to the societal benefits.



### **Shri Kartikeya Sarabhai**

Director, CEE

Climate Change has emerged as perhaps the most important issue facing the continuity of life on earth, in the way we know it. India has launched a National Action Plan on Climate Change with initiatives that include the creation of 8 core "national missions". The Gujarat Government has also taken the path breaking step to form a Climate Change department to focus on these issues.

But the success of all such initiatives depends on having trained people to run them. Over the next several years there will be a major demand for professionals from a variety of basic disciplines who understand Climate Change. This is the importance of the new Management Education Centre on Climate Change being launched by the Gujarat University in collaboration with CEE.

We at CEE look forward to this partnership and are confident that the course will train professionals who will play a very significant part in both the efforts at Mitigation and Adaptation for Climate Change.



### **Dr. Yogesh T. Jasrai**

Co-coordinator, MEC-CC

The main focus of the global environment has been the climate change. This is because of the greenhouse gases (GHGs) through indiscriminate use of fossil fuels. The increased GHGs are likely to be responsible for raising the average temperature of this planet-earth, influence precipitation / storm patterns including the sea-level rise. In this regard, the most promising need is to understand the scientific basis of climate change, its impact, and adaptations including management strategies in mitigation of such effects. This course would certainly train a strong man-power to combat impacts of climate changes efficiently.

The vision of our honorable Vice-Chancellor, Dr. Parimal H. Trivedi has played a great role in promoting such an innovative program on climate change.

In the early 19th century, scientists discovered that trace amounts of atmospheric gases, including carbon dioxide and methane, were responsible for retaining some of the sun's heat in the lower atmosphere. However, industrial revolution and use of huge amount of fossil fuel has increased the atmospheric concentration of these gases drastically and changed the energy balance of the planet. This raises the average air temperature in the lower atmosphere and more energy is retained as heat. The result is climate change.

#### **What is Climate Change?**

Climate change is a long-term shift in the statistics of the weather (including its averages). For example, it could show up as a change in climate normals (expected average values for temperature and precipitation) for a given place and time of year, from one decade to the next.

#### **Why is the Climate Changing?**

The climate is changing due to natural variability and human induced changes. Natural variability is related to interactions among the atmosphere, ocean and land, as well as changes in the amount of solar radiation reaching the earth. Human induced changes include emissions of greenhouse gases. The current level of GHGs is highest in the past 6,50,000 years. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change concludes, that most of the observed increase in the globally averaged temperature since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.



#### **What are the Impacts?**

Scientists are expecting more severe impacts on human and natural systems in the coming decades. Accessibility to food, water, raw materials, and energy are likely to change. Human health, biodiversity, economic stability, and national security are also expected to be affected by climate change. Climate model projections suggest that negative effects of climate change will significantly outweigh positive ones.

The nation's ability to prepare for and adapt to new conditions may exceed as the rate of climate change increases.

#### **What can be done?**

Reducing our vulnerability to these impacts depend not only upon our ability to understand the implications of climate change, but also upon our ability to integrate and use that knowledge effectively. Changes in our economy and infrastructure as well as individual attitudes, societal values, and government policies will be required to alter the current trajectory of climate's impact on human lives. The resolve of individuals, communities, and countries to identify and implement effective management strategies for critical institutional and natural resources will be necessary to ensure the stability of both human and natural systems as temperatures rise.



#### **Why it is important to know about Climate Change?**

Climate change will bring economic and environmental challenges as well as opportunities, and citizens who have an understanding of climate science will be better prepared to respond to both. Society needs citizens who understand the climate system and know how to apply that knowledge in their careers and in their engagement as active members of their communities.

To protect fragile ecosystems and to build sustainable communities that are resilient to climate change-including extreme weather and climate events-a climate-literate citizen is essential. With the recognized future needs of society, there is an urgent need to train high-quality graduates and create specialist that will contribute to solutions of climate change consequences.

This course will guide to identify the essential principles and fundamental concepts that individuals should understand about climate change. Such understanding will improve ability of students to make decisions about activities that increase vulnerability to the impacts of climate change and to take precautionary actions that would reduce these vulnerabilities.

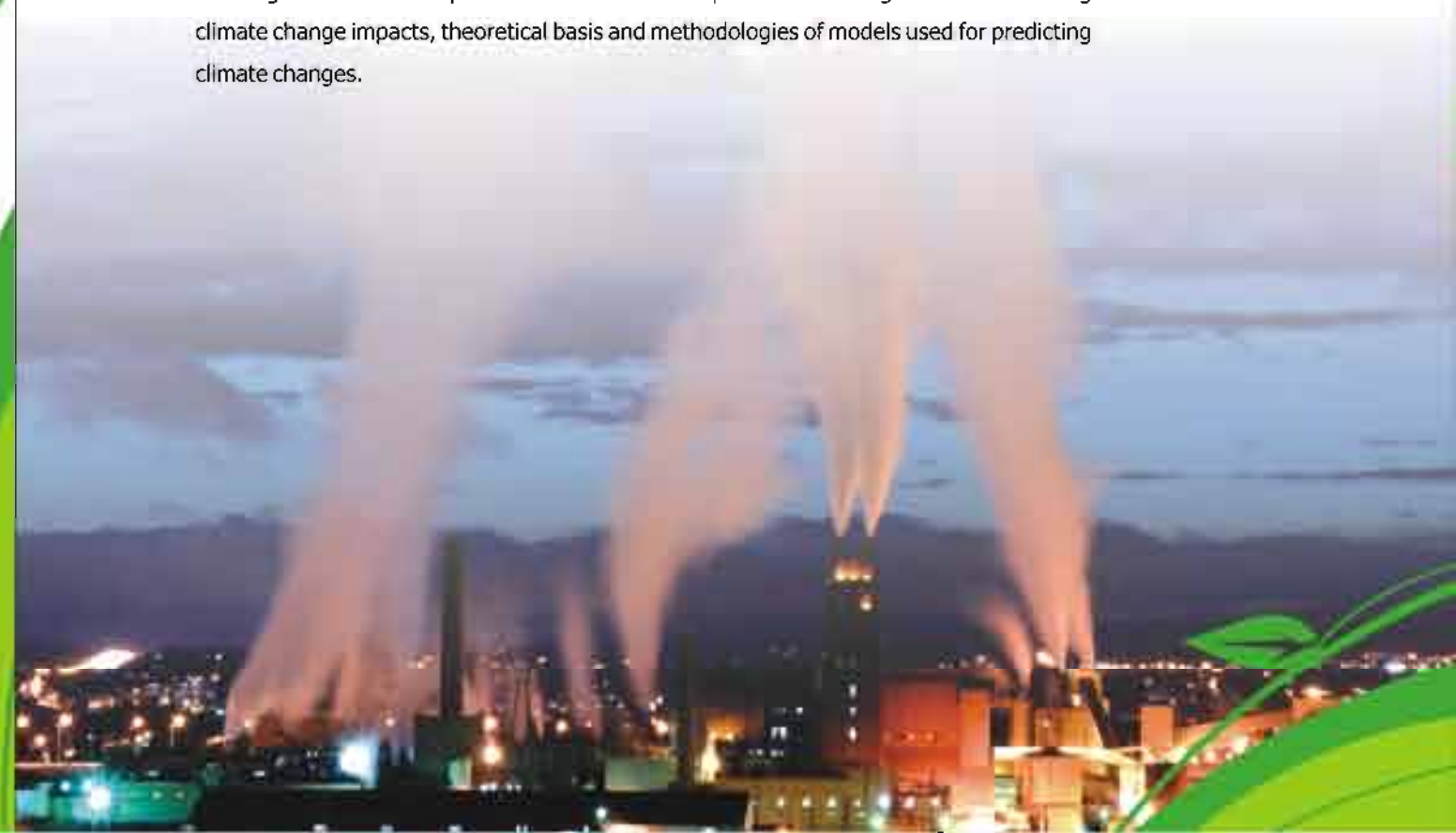
#### **Why this Course?**

As the effects of global climate change are felt, the demand for professionals able to address the challenge increases. This course is for those individuals who wish to understand the big picture of what climate change is, how it has emerged, and how to deal with global climate change. It is also for people who want to learn practical skills enabling them to gain employment and putting this understanding into practice. Due to its multidisciplinary nature, this course is suitable for graduates from a wide variety of disciplines and for career professionals with relevant experience.

This course, the first of its kind, will integrate understandings of climate change issues from its emergence to management.

#### **About the Course**

The aim of this course is to provide students with a clear understanding of the main issues related to Climate Change (causes, impacts, mitigation and adaptation). The course involves in-depth analysis of important aspects and issues related to climate change. It contains various perspectives on basic science of climate change, its consequences and management of vulnerability along with the actions societies have taken to address its potential and actual impacts. Study on natural processes and human activities which alter the composition of the ocean and atmosphere and trigger climate change at different temporal and spatial scales, will develop a basic conceptual understanding of the complexity of the climate system; systems of energy flow, atmospheric and ocean circulation; records and indicators of climate change; and the observed and potential effects of anthropogenic-induced climate change on human and natural systems. Understanding of international responses and individual responsibility for future challenges will be developed. The course will also provide knowledge basis of modeling climate change impacts, theoretical basis and methodologies of models used for predicting climate changes.



### Course Objectives

The aim of this course is to equip the students with knowledge in climate change and skills to facilitate appropriate mitigation and adaptation in conjunction with the larger developmental agenda of our country.

This will include:

- In-depth understanding of the natural and human induced factors responsible for the climate change
- Responses required to address these impacts and vulnerabilities
- Implications of climate change on physical, biological, social, economic and cultural environmental conditions.
- Professional development in the field of climate change for practitioners with problem solving practical skill.

### Duration of Course

The duration of the program will be two years with six months exclusively for dissertation and research work. The academic sessions will consist of theory, practical work and field visits.

### Course Outline

The course will consist of all aspects ranging from climate change history, science, consequences, national and international legislation to its management.

#### Semester

##### I- Basics of Climate and Climate Change

- Introduction to climate change- historical review
- Climate Science
- Global warming and Climate Change

##### II- Impacts assessment and Legislation

- Impacts of Climate change
- Tools and techniques for impacts assessment and measurement
- Policy and legislation

##### III- Management Strategies

- Climate change adaptation
- Climate change mitigation
- Individual actions

##### IV- Dissertation

### Teaching and Assessment

- The objective is to link theory and practice, involving the use of a wide range of tools including lectures, case studies, field trips, individual projects, report writing and presentations.
- Semester system will be followed and each academic year will be divided into 02 semesters.
- Each semester will comprise of total 13 weeks teaching (including practical).
- In the fourth semester, student has to undertake a project work in any selected institution or organization working in the respective course field.
- Each semester will comprise of three papers of four units each and therefore 12 periods per week.
- There will be four periods for practical and two for seminar per week.

The theoretical understanding and practical tools will enable practitioners to more effectively integrate best practice, vulnerability assessment tools and techniques with nationally and internationally endorsed environmental management systems. Such tools, techniques and systems are designed to mitigate unwanted effects of climate change and manage the outcomes of the implementation of project implantation in ways that ensure continuous improvement in the environmental conditions and the sustainability of natural resources.

Case study examples will be used to explore policy outcomes at different levels and the application of different methods relevant to mitigation and adaptation practice. Within the modules there is considerable scope for students to direct their learning towards fields of particular interest, especially through their choice of dissertation. Most of the course will be delivered through lectures though there will also be directed learning and a seminar presentation/discussion. Seminar presentations are designed to explore current research and debate in specific areas of climate change.

### Assessment

- Methods of assessment include seminar, project work, essays, case studies, reports and a dissertation. Each taught module will be assessed by written examination and viva along with assignments to monitor engagement of students.
- Award of the Master of Science degree will depend also on the satisfactory completion of the research project on which a dissertation will be submitted.
- Monitoring of students' progress is continuous and thorough, with regular informal communication between students and teaching staff.

### Learning Outcomes

On completion of the course students would be expected to have a critical understanding and knowledge of:

- The essential principles of Earth's climate system and how they interact
- How to assess scientifically credible information about climate
- Communication skills about climate and climate change in a meaningful way
- Able to make informed and responsible decisions with regard to actions that may affect climate
- Appreciate international understanding of emerging trends in vulnerability assessment and management of climate change
- Better understand international and national legislations
- Know about some of the important integrated management tools and techniques
- Current research, issues and debates within the subject area.

### Teaching Faculty

The academic sessions will be undertaken by the subject experts from Gujarat University, Centre for Environment Education and other renowned organizations and institutions.



### Admission Criteria

#### Eligibility

- The minimum requirement for admission to the course is graduates in field of Sciences / Economics / Engineering / Agriculture / Forestry / Rural studies / Development studies / Management / Geography etc with at least 55% score.
- A student from any University (other than Gujarat University, Ahmedabad) has to produce provisional eligibility certificate from Gujarat University, Ahmedabad along with the application form
- Entrance test will be conducted and syllabi for that will be of general climate and weather science of graduate level.
- Admission will be solely on the merit list based on the scores in the Entrance test (60%) and marks at the final year of graduate degree (40%).

#### Students Intake:

- Maximum 30 seats (25 regular and 5 special fee seats)
- Admission will be confirmed only on payment of necessary fees in a given time.

#### Fee Structure

Rs. 20,000/- per semester for regular seat

Rs. 30,000/- per semester for special fee seat

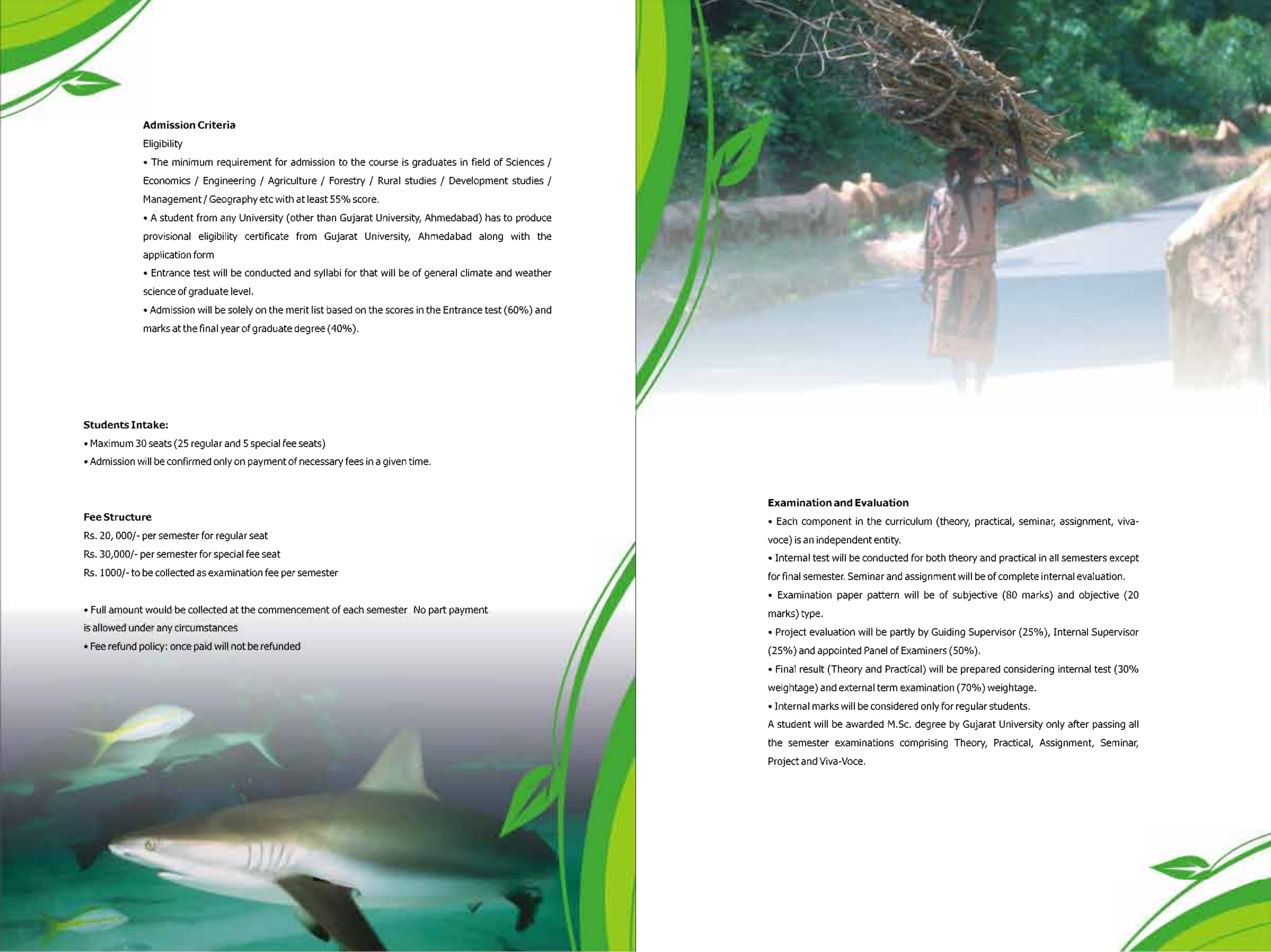
Rs. 1000/- to be collected as examination fee per semester

- Full amount would be collected at the commencement of each semester. No part payment is allowed under any circumstances
- Fee refund policy: once paid will not be refunded

#### Examination and Evaluation

- Each component in the curriculum (theory, practical, seminar, assignment, viva-voce) is an independent entity.
- Internal test will be conducted for both theory and practical in all semesters except for final semester. Seminar and assignment will be of complete internal evaluation.
- Examination paper pattern will be of subjective (80 marks) and objective (20 marks) type.
- Project evaluation will be partly by Guiding Supervisor (25%), Internal Supervisor (25%) and appointed Panel of Examiners (50%).
- Final result (Theory and Practical) will be prepared considering internal test (30% weightage) and external term examination (70%) weightage.
- Internal marks will be considered only for regular students.

A student will be awarded M.Sc. degree by Gujarat University only after passing all the semester examinations comprising Theory, Practical, Assignment, Seminar, Project and Viva-Voce.





### Break-up of marks

Semester	Theory		Practical		Seminar	Assignments	Field Visit	Viva Voce	Total
	Paper	Marks	Paper	Marks					
I	03	3 x 100 =300	01	70	10	10	10	50	450
II	03	3 x 100 =300	01	70	10	10	10	50	450
III	03	3 x 100 =300	01	70	10	10	10	50	450
IV	Project		---	---	10	20	20	50	450
	1. Report	100							
	2. Evaluation	100							
	3. Defense	150							

### Award of Class and Standard of Passing

Subject	Minimum % for Passing	Standard of Passing (out of)		Minimum Marks for Passing	
		External	Internal	External	Internal
Theory	40%	70	30	28	12
Practical	50%	70	30	28	12
Viva	40%	--	50	--	20
Seminar	36%	--	10	--	04
Assignment	36%	--	10	--	04
Field Visit	36%	--	10	--	04

First with distinction- 70% and above | First 60% and above | Second 50% and above

### NEW COURSES INTRODUCED BY GUJARAT UNIVERSITY

#### Master Level

Climate Change and its Management | Master of philosophy (Diaspora)

M. Sc. | Bio-informatics | Human Genetics

Biotechnology | Biomedical Technology

#### Post-Graduate Diploma Level

Plant Tissue Culture | Space Science and Application

Port management | Bio-diversity Management | Investment & Financial Analysis

Taxation (Including VAT)

#### World Language Laboratory

French | German | Spanish | Russian | Japanese

Greek | Italian | Chinese

#### Special Courses for NRI's

Mehndi | Art of Rangoli | Film Music

Indian Literature | Religion of India & traditions

#### International Programs

Rural business development service programme

Traditions and design process in India Ecology and Design

Journalism and public relations | Indian rural management skill

#### Courses for Foreign Students

Study in gandhian philosophy | Artistic / cultural identities of India

Indian poetics | Yoga and meditation | Indian Languages

Classic / Folk dance of India | Journalism and public relation