

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

Application Form for Student Summer Research

Name of the Home Institution: _____

Application for: _____
Please indicate dates. (The Summer Break Period is 2nd May – 25th July)

Qualifications: _____

Department (*Area of Interest*): _____

A brief description of the project: _____

A brief description of your interests: _____

AFFIX RECENT
PASSPORT SIZE
PHOTOGRAPH

A. Personal Data of the student applicant :

1) Name: _____
(in block letters) (*First Name*) (*Middle Name*) (*Last Name*)

2) Date of birth: _____ 3) City/Country of Birth: _____

4) Citizen of: _____

B. Address of the student applicant :

i) Address for Correspondence: _____

Tel: _____ Fax: _____ E-mail: _____

ii) Address of the University/Department: _____

Tel: _____ Fax: _____ E-mail: _____

C. Studies at Home Institution:

i) Department & Degree: _____

ii) Academic Year/Semester: _____

iii) Special Interests, hobbies, extracurricular activities: _____

Place: _____

Date: _____

(Signature of the Applicant)

D. Recommendation and Forwarding by Home Institution

It is certified that the above mentioned is a full-time student at our Institute/College/ University and she/he is recommended for summer collaborative work with Prof. _____
_____ at IIT Gandhinagar.

Name of the Institute

Signature

Seal of College

Name of Forwarding Authority

Enclosure Check List:

Letter of Interest from a faculty at IIT Gandhinagar

Two letters of recommendations

A check of Rs. 4000 in favor of IIT Gandhinagar. (**The amount will be refunded** if you are not selected, or on the completion of the program)

Mail the form to:

The Professor in-charge, Academic Affairs
Indian Institute of Technology Gandhinagar
VGEC Complex, Chandkheda
Ahmedabad, India - 382424

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

Letter of Interest for Summer Research Intern

Dear Professor-in-Charge, Academic Affairs

I would like to invite _____ (*Name*) to IIT Gandhinagar for the summer of _____ (*Year*) to work on a collaborative project from _____ (*Beginning Date*), to _____ (*End Date*).

The proposed work involves (*Project Description*) _____

Sincerely,

(*Signature*)

(*Date*)

(*Name of IIT Gandhinagar faculty host*)

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

Summer Research Internship Projects

Project: Virtual geotechnical laboratory

Proposer: Prof. Amit Prashant

Description: In this project, an online virtual environment is being developed which will facilitate simulation of a series of geotechnical testing methods. With an objective of overcoming the limitations of existing pedagogy of geotechnical laboratory courses, this test simulator will provide knowledge of experimental apparatus, test procedure, interpretation, and errors associated with the measurement techniques. The knowledge of learning and teaching styles in engineering education are considered in this research. The simulations will include field sampling techniques, test sample preparations, step-by-step testing procedures, interpretation of results and other peripheral information, and quizzes for self evaluation. Most of the information will be available in both text and audio format. The inherent virtue of these developments is to include the known facets of the soil behavior in the simulations in such a way that a learner can interpret those aspects by performing a variety of tests and comparing the results. Besides developing good understanding of geotechnical testing methods and related issues, the student is expected to generate/compile the necessary material needed for simulations and other peripheral information. The student with some skills/interest in computer graphics and database can also gain experience in simulation work.

Project: Case studies of liquefaction induced lateral spreading during earthquakes with special focus on Kutchh region

Proposer: Prof. Ajanta Sachan, and Prof. Amit Prashant

Description: There are several case studies available which provide information about the soil strata and measurements of lateral spreading due to liquefaction during earthquakes. This phenomenon is of major concern in many low lying areas (with high water table) and the developments near rivers, lakes and dams. Several of such locations where this phenomenon was observed in the past had developed infrastructure and experienced major damage. With the pressure of further infrastructure developments in these areas, major land reclamation and development projects are being taken up across the world. The Kutchh region of Gujarat (India) is an excellent example. It is essential to understand liquefaction induced lateral spreading in Kutchh region during Bhuj Earthquake 2001 based on the experience gained so far through many case studies across the world through a critical analysis. Such understanding will help us to develop protective measures and better design procedures for new construction in Kutchh region. The student is expected to go through many case studies of liquefaction induced land

spreading from across the world and perform critical analysis through comparisons of its various aspects. This investigation will also include specific information about Kuchchh region in order to identify specific locations of concern, which will be used to perform technical evaluation of the problem.

Project: Powder processing using nano-coating

Proposer: Prof. Chinmay Ghoroi

Description: Powder processing is an integral part of many industries. In most of the cases, it is desired to have free flowing, highly packed powders with very high surface area. However, increased surface area increases the fineness of powder, which makes the powder more cohesive due to inter-particle force of attraction. For neutral and dry powders, inter-particle force is mainly due to van der Waal's force and it dominates over particle weight. This leads to very high granular Bond numbers, B_0 (defined as the ratio of the attractive inter-particle forces to particle weight) and affects the flow and packing properties of powder. As particle size falls below $30\ \mu\text{m}$, powder becomes extremely cohesive and does not flow under gravity. They are hard to flow and fluidize. Controlling flow of such fine powders is real challenge in industry and the key indicator of the success of the process. Reaction among these particles is the other concern as they require very high temperature to form the solid product. As a result, powder reactions are highly energy intensive. Thus, objective of the research topic is to develop a technique which can increase the flowability, bulk density and reactivity of the solid particles. The project involves design of a coating device which can coat the nano-particle on the surface of desired particles and produce the engineered particles of desired properties.

Project: Ordinary Differential Equations and its Applications

Proposer: Prof. Jagmohan Tyagi

Description: This project would involve the basic qualitative understandings with the course. These are basic concepts, geometric meaning of direction fields of first order ordinary differential equations, solution methods for nonlinear equations with applications to real life problems, existence and uniqueness of first order as well as higher order equations, Wronskian, exact differential equations, integrating factors, Bernoulli's equations, orthogonal trajectories with applications, and several delicate techniques of solving the higher order equations in the light of scientific examples.