

PG Program

Proposed Models for IIT Rajasthan

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# Objectives of PG Programs

- Advancement and proliferation of scientific and technological knowledge
- Address the scientific and socio-economic issues
- To prepare trained manpower for improving overall UG teaching in the country
- Inculcate strong research and innovation based mindset in the future engineers, teachers and scientists
- Foster links between academia, R&D institutions and the industry

# Masters Programs: Various Models

- M.Tech Programs
  - heavy on course work
  - a small project
- M.S. by Research Programs
  - heavy on research
  - almost no courses
- A hybrid Programs
  - Course work for about one year
  - One year of thesis
- MS-PhD Programs
  - Enrollment into PhD program with exit option with Master degree
  - Entry for students with both Masters and Bachelors degrees from wide backgrounds
- Each programs caters to students of varying background and interest
- Objectives are specific to each programs

# Course Based M.Tech. Program

- 12 courses in 3 semesters
  - would comprise a core of 4 to 6 courses
- Project work
  - In the final semester
  - Can be linked to a industry
- Time bound
  - Students to strictly complete the program in 4 semesters

# Course Based M.Tech. Program

- Expectations from the Program
  - Students with B.Tech. from various engineering colleges and having varied backgrounds
  - Strengthen the background of above students who could then pursue a career in industry, academia or research
  - Course structure of the program
    - Should also be attractive to students having relevant background but are unsure about pursuing a research career
  - Students may be able to change mid-way to a research based masters or MS-PhD program

# Course Based M.Tech. Program: Proposed Structure

- Core Course
  - Institutional Core
    - A Mathematics course (e.g. consisting of differential equations, numerical analysis, and probability and statistics)
    - A course on design and research methodologies – can be hands on with a project
    - 1-2 HSS courses on communication skills, technical writing skills, ethics, etc.
  - Departmental Core
    - 3-4 department specific courses
    - One course on Modelling and Simulation (can be shared between a few disciplines)
    - One course on experimental techniques (lab based)
    - For example, in case of Materials Science and Engineering Department: *Structure of Materials, Thermodynamics, Kinetics, and Phase Equilibria*
- 3-4 Departmental elective courses (can be stream/specialization based)
- Short projects and short courses in winter and summer breaks
  - Design projects
  - Industry projects
  - Courses to improve technical and personal skills
- A final semester project for a primarily course based program

# Masters Program with thesis

- Who should join such a program
  - B.Tech. / M.Sc. Students with adequate background
  - Students genuinely interested in pursuing a research career
  - Avenue for changing into the PhD program for exceptionally motivated students
  - Students could be allowed to switch into the course based M.Tech. program
  - Flexibility in doing the courses

# A Possible Model

## Semester 1

IC 1	IC 2	IC 3	IC 4	DC 1
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## Winter Break

Short HSS Courses  
Technical Skills and Ethics courses

IC: Institute Core  
DC: Departmental Core  
DE: Departmental Elective

## Semester 2

DE 1	DE 2	DE 3	DE 4	Lab
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## Summer Break

Short HSS and Technical Skills and Ethics courses  
A Design / Industry Project

## Semester 3-4

Research Project with Periodic Evaluation

# Hybrid Program: Thesis

- One year thesis work
- Formation of a monitoring committee
- Periodic evaluation by the committee
- Students should be encouraged to publish their research output
- Flexibility in submission deadlines

# Research Based M.Tech. Program

- Admission of motivated students from a wide array of backgrounds
- Students to work on a two year thesis work (with marginal flexibility in deadlines)
- Students to work on a specific well designed problems e.g. specific sponsored projects
- If needed, student may be permitted to do a few courses
- Emphasis on publication/patenting of research output
- Periodic evaluation of the progress is must
- Students may be allowed to enter into a PhD program

# MS-PhD Program

- Students with B.E./B.Tech./M.Sc. degree are admitted directly into PhD program
- Courses for first two semester followed by a review
- At this stage, exit to Masters program is possible
- Further research to monitored periodically
- Students to be involved in UG teaching and labs
- Emphasis on technical writing and communication skills

# Evaluation Process

- Formation of committee
- Periodic presentations and meetings with the committee
- Weightage to various aspects of the research should be carefully considered
- Thesis Supervisor and mentor/counsellor model can be applied