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ENGINEERS WITH
SOCIAL RESPONSIBILITY

NAAC Accredited
Recipient of Centre of Excellence Award by the Government of Gujarat
Recipient of '5 Star' in GSIRF Ranking by Government of Gujarat

Doctor of Philosophy Programme

The institute's doctoral programme leading towards the award of the Degree of Doctor of Philosophy (PhD) provides the students an opportunity for a career in academia or in R&D industry and organization. The institute aspires to take a leading role in the research areas related to ICT and selected areas of Humanities and Social Sciences. The doctoral programme comprises both course and research work; the amount of coursework one has to undergo depends on the candidates' past background and the research one is engaged in. The research work to be undertaken for his/her PhD must include original contribution to the knowledge reserve culminating in a thesis to be submitted for the doctoral degree. The institute supports full-time and part-time PhD supervision. The institute also allows sponsored candidates to pursue PhD study with whom the institute has established a co-operative research programme of over five years or has signed an MOU. All full-time PhD students are eligible for financial support in the form of Teaching Assistantship (TA) / Research Assistantships (RAs). The responsibilities associated with the teaching / research assistantship includes conducting laboratory courses and tutorials for undergraduate students, assisting in teaching, research projects, and academic administration and performing research proposals.

Program Outcomes (POs)

As stated by NBA, POs represent the knowledge, skills and attitudes the students should have acquired at the end of the program.

PO1: **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6: **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9: **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12: **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

PSO1: To apply the theoretical concepts of computer engineering and practical knowledge in analysis, design and development of computing systems and interdisciplinary applications.
PSO2: To work as a socially responsible professional by applying science-technology-society in real-world problems.

Programme Educational Objectives (PEOs)

PEO1: **To** prepare students to solve and analyse challenging research problems applied to industrial use and societal growth.
PEO2: To prepare students for their contributions in research and development by pursuing higher studies in the field of engineering, science, business, or administration.
PEO3: prepare students with the necessary theoretical background and technical skills to work professionally as researcher, analyst, scientist, entrepreneur, software developer, and teaching professionals.
PEO4: To prepare students who will be socially responsible citizen with ethical and leadership qualities and effective interpersonal skills.

Course Work Requirement

Table 1 summarizes the course work requirement for the PhD program. Based on their respective categories students are required to complete the minimum total credits, as indicated in Table 1.

Category	Minimum Total Credits	Minimum Course Credits	Minimum Research Credits	Duration (Years)
Regular (Full-time) – MTech/ME/MS/MPhil	72	12	48	4-5
Regular (Full-time) – MSc	80	20	48	5-6
Regular (Full-time) – MA	80	21 to 24	48	5-6
Regular (Full-time) – BTech/BE/MCA	80	24	48	5-6
Sponsored/External (Part-time) – MTech/ME/MS/MPhil	72	12	48	4-5
Sponsored/External (Part-time) – MSc	80	20	48	5-6
Sponsored/External (Part-time) – MA	80	21 to 24	48	5-6
Sponsored/External (Part-time) – BTech/BE/MCA	80	24	48	5-6

Table 1: Course work requirement for the PhD program

Course Credits

A student depending on the category needs to take a certain number of minimum course credits, as mentioned in Table-1. The prospective supervisor/mentor of the student will advise the student to take necessary courses based on the broad domain of the area of interest.

Research Credits

Research credits (Example: PC801 Research-1 (3 credit)) are advisable for the student once he/she successfully clears comprehensive examination. The number of research credits a student can register in a semester is same as course credits (i.e., min. 9 credits and max. 15 credits).

Semester Load Requirements

A semester load is defined as equivalent of 12 credits. A student registered for a full semester load solely by course work would typically take 4 courses. Depending on the merits of the case, the PGC may permit a student to register for a maximum of 15 credits or a minimum of 9 credits in regular semester registration.

Audit Courses

The students are permitted to audit courses. They will be given a 'P' grade, which will be entered in their grade card if they satisfy the requirements placed by the course instructor. If they do not meet the requirements, then they will not get any grade and no entry will be made in the grade-card/transcript for that course.

NOTE: Undergraduate course of level 3 and 4 may be open to PhD student for course credit, and extra academic components could be added to such undergraduate courses, to elevate them at par with the PhD level course work. Such permissible course should have a different course identity for the PhD student's registration.

Self-study courses

A student earns 3-credits for every self-study course taken.

Maximum number of allowed Self-study courses is **three** with no more than **one** in a single semester.

For taking a self-study course, student should apply to the Dean-AP with

(i) the detailed course contents.

(ii) expected outcome of the course.

(iii) consent from the supervisor/mentor with whom the self-study course is taken.

The student's performance on his/her self-study course would be evaluated by the course instructor/mentor with whom the student is doing self-study course. A letter grade would be awarded by the instructor/mentor of the student based on the student's performance in self-study course.

Supervisor Selection and RPC Formation

Supervisor or faculty mentor for a student enrolled in the PhD program can be identified by the student as early as possible, preferably by the end of the first semester. Once a prospective supervisor or faculty mentor is identified, Dean-AP can formally assign the student with the supervisor/mentor. After successful completion of comprehensive examination of a student, a formal consent of the supervisor(s) will be obtained by the office of Dean-AP, who will act as the supervisor(s) for the student.

Research Progress Committee (RPC) comprising a prospective supervisor and two faculty members in the relevant research area will be formed by the Dean-AP's office for the candidate after completion of the student's comprehensive examination.

Additional options for earning course work credits

Students can avail following options to fulfil minimum course credits based on the

recommendations of the RPC/PGC and approval of the Dean-AP.

(a) Three Self-Study courses (up to a maximum of 9 credits - maximum one Self-study course in a semester) before appearing the comprehensive examinations. The self-study course can be in the form of reading material, archival study, and courses in online/MOOCs platform. The course in MOOCs should be taken in consultation and approval of the assigned faculty supervisor/mentor and must be done under a faculty supervision, who will assign the grade for the course after successful completion of the course.

(b) Professional research experience in relevant area more than 5 years in R&D organizations, industry/research Labs, Universities may be considered for counting 6 credits in respective domain expertise based on the recommendations of the faculty supervisor/mentor and approval of the Dean-AP.

(c) Transfer of credits, as applicable, at postgraduate level course in reputed organization may be considered based on the production of valid certificate or weightage of the course(s) and on the recommendations of the faculty supervisor/mentor and approval of the Dean-AP.

NOTE: *Transfer of credits for courses done outside: Students may be permitted to do courses in places of repute outside DA-IICT. Based on their performance and the content/nature of the course, the PGC may consider them equivalent to some course credits and waive credit requirements for required course work credits at DA-IICT. Any such waivers/transfer is permitted only if the courses being considered have not been counted for any other degree/diploma requirement.*

Residency requirement

Residency during a semester implies that student is available in the campus of the Institute for course work and research activities during all working days of the semester.

- Students enrolled under Regular category should fulfil residency requirement during course work credits and research credits, both.
- Students enrolled under Sponsored and External category should fulfil residency requirement during course work credits.

Under certain special circumstances the residential requirement for the sponsored and external candidates may be relaxed or waived, who may be permitted to complete their course work requirements through recognized web based on-line courses (e.g. MOOCs) or to earn course credits from an organization of repute on the basis of the recommendations of the faculty supervisor/mentor and approval of the Dean-AP.

Comprehensive Examination

- Students registered in the PhD program must pass a comprehensive examination designed to test the overall comprehension of the student in the relevant subjects.
- The comprehensive examination consists of two parts: **(i) Written or qualifiers**

and (ii) Proposal defense. The **qualifier** examination will test candidate's competency in the broad discipline, in which the candidate plan to pursue his/her PhD study. The syllabus of comprehensive examination should be based on the foundation subjects of candidate's area of interest. The **proposal** defense consists of a research proposal which must be presented to Comprehensive committee no later than two months of a candidate clearing the qualifier exam.

- Comprehensive Committee will be formed by the Dean-AP, which can evaluate the candidate's qualifier and proposal defense.
- Students admitted with **MTech/ME/MS/MPhil** degree may appear for the qualifier examination **earliest after completing first semester but must pass it before starting the third semester** after their first registration. Students admitted with **MSc/MA/BTech/BE/MCA** degree may appear for the qualifier examination **earliest after completing second semester but must pass it before starting the fourth semester** after their first registration. The above time limits are exclusive of the period of sanctioned withdrawal, if any.
- The maximum number of attempts for the comprehensive exam is **two**. A student can appear for only one PhD Comprehensive examination in a given semester.
- Students should have a minimum CPI of 7.0/10 in order to be eligible for appearing in the comprehensive examination.
- A student will have to discontinue the PhD program, if he/she fails to pass the comprehensive examination even in the second attempt.
- A Student enrolled in the PhD program is formally admitted to the candidacy for the PhD degree after he/she has passed the comprehensive examination.

Research Progress Seminar

Research Progress Seminar (RPS) is held twice a year, (typically once in November (for Autumn Semester), and once in April (for Winter Semester) for the students who have cleared their comprehensive examination.

- RPC of the student will assess the student's research progress.
- RPC may invite an external expert during the student's RPS. The supervisor of the student requires a formal approval of the Dean-AP for involving an external expert in his/her student's RPS.
- Grades of the student will be decided by the supervisor in consultations with the RPC members.

PhD Synopsis

- A PhD student is expected to successfully complete PhD Synopsis examination by the stipulated maximum duration, as indicated in Table 1.
- Student should obtain consent of his/her supervisor/RPC for synopsis registration.
- Student needs to register for synopsis in the beginning of the semester.

- The Synopsis Committee for the candidate will be constituted by Dean-AP.

After successfully completing PhD Synopsis exam

1. Student should submit PhD thesis to Dean-AP within a maximum time of **6 months**.

Migration Rules

Eligibility for MTech Degree: A PhD student who fails to pass the PhD comprehensive examination within the specified duration is eligible to receive the MTech degree under the following conditions:

- The student fulfils the eligibility criteria for MTech program.
- The student fulfils the criteria for continuation in the MTech program.
- The student submits an MTech thesis which fulfils the requirements for such within a maximum of two semesters. This duration would commence from the semester immediately following the semester in which the student failed the PhD comprehensive examination. Furthermore, the student may not be eligible for financial support during this period.

PhD to MTech Migration: Students in the PhD program are eligible to migrate to the MTech program provided they submit an application to the Dean (Academic Programs). Such an application can be accepted only when a student has completed a minimum of two semesters of PhD and fulfils the following criteria:

- Student should have entered to the program with a BTech/BE/MSc degree or equivalent.
- An appropriate MTech program should be available in the Institute.
- At least 18 course credits completed.
- Student should have a minimum CPI of 6.5/10.0.

Completion of Requirements for MTech Program: A student who migrates to the MTech program from the PhD program must complete all requirements for the MTech Degree within two years (four semesters) from the time of migration. The credits earned as a PhD student would be carried over to the MTech program.

Termination of a student's PhD Admission

- More than 5 unsatisfactory(X) grade in research courses during the entire PhD program would lead to a termination.
- Student who has not defended his/her PhD Synopsis successfully before the 'Max Duration (Years)' allowed then admission of that student will be terminated from PhD program. Such a student may request for fresh admission to PhD program by submitting an application to the Admission Committee. If the Admission Committee approves his/her admission, the candidate can be registered as a fresh PhD student and he/she will require completing academic requirements.

If the student fails to pass the comprehensive examination even in the second attempt,

then his/her PhD admission will get terminated.

PhD Thesis

The PhD student should submit his/her phd thesis for examination within 6 months of the date of approval of his/her phd synopsis. The thesis is sent for examination to one examiner within India and one examiner outside India.

The examiners may suggest that the thesis be accepted as it is, may suggest minor corrections, or may suggest rejecting the thesis.

PhD defense

If the thesis is accepted by the examiners, or after minor corrections have been made, the PhD student defends his/her thesis in a presentation in which the examiner from India (typically) is invited. The student is awarded the PhD degree if he/she successfully defends the thesis in the subsequent convocation.

Executive Registrar
DA-IICT, Gandhinagar

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