

The Doctoral Programme at IIT Kanpur

**Recommendations of the
Fifth Academic Programme
Review Committee**

December 2012

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Executive Summary

•**Credit system and registration:** The Academic Programme Review Committee proposes a completely credit-based system. In this system, the course credits will be computed based on the student-time required per week for the course using the following formula.

$C = L + T + P + SS$, where C is the number of credits, L is the number of lecture hours, T is the number of tutorial hours, P is the number of laboratory hours, and SS is the number of self-study hours given by the following formula with A representing the additional number of hours needed for assignments and projects, as decided at the time of approval of the course.

$$SS = 2L + T + A$$

There is no discussion hour in any course. The overall credit formula then becomes $C=3L+2T+P+A$. The normal PhD load of a typical student is 36 credits per semester. A PhD student may register for 27-45 credits in a semester. Four thesis units per semester is prescribed as the normal academic load for students doing no course work. Each thesis unit corresponds to nine credits. PhD students must register in summer for at most 18 credits. The credit system is discussed in detail in Section 2.1.

•**Grading scales:** Added a new grade A* with same equivalent points as A grade to recognize excellence on transcripts. The grading scales are discussed in detail in Section 2.3.

•**Thesis grade:** Each thesis unit should be graded satisfactory (S) or unsatisfactory (X). See Section 2.5 and Appendix I for further detail.

•**Graduation requirements:** The minimum graduation requirement for a PhD degree is 54 course credits (in addition to the Communication Skills course) and 90 thesis credits. The student must have a minimum of B grade in 27 credits (roughly three courses). See Section 2.7 for more detail.

•**Comprehensive examination:** The current prescription according to the PhD manual. Only oral examination is mandatory. See Section 2.7.1.

•**State-of-the-art examination:** The current practice can be continued i.e., state-of-the-art examination must be taken within six months of comprehensive examination. See Section 2.7.2.

•**Mentoring/Monitoring of students** A doctoral committee should mentor/monitor the student's progress starting from the comprehensive examination till the end of the degree programme. See Section 2.8.

•**Thesis Examination:** The current practice may be continued. It is further recommended that the committee for the thesis and oral examination should include members of the doctoral committee who mentor/monitor the student's progress. See Section 2.7.3.

•**Exit option:** A student can opt for a Masters' degree, if available in the concerned department, if he/she fails the comprehensive examination the maximum number of times permitted by the PhD manual. See Section 2.9.

•**Communication skill:** The communication skills can be acquired by a PhD student through either a web-based course, a course module taught by a professional, or a seminar course. This is a 2-5 credit, Pass/Fail course. See Section 2.2 and Appendix II for further detail.

•**Interdisciplinary research:** While the academic programmes in the respective departments should continue, it is recommended to have flexibility in setting up academic programmes that run across more than one department. See Section 3 for a discussion on this topic.

1. Introduction

It is nearly 50 years since the Indian Institute of Technology Kanpur (IITK) was established. This is the first time that the Institute is conducting a review of its PhD programme.

Goals of a Doctoral programme

The "Doctor of Philosophy" (PhD) is the highest academic degree offered by an academic institute. The aspect of the doctoral programme that distinguishes it from other academic degrees is "research". The goals of an ideal doctoral programme are:

- To build a scientific temper and inculcate a desire for acquiring and creating knowledge via exploration, investigation, and contemplation.
- To produce versatile researchers with sufficient breadth and depth of knowledge.
- To produce individuals who yearn to extend the frontiers of their areas of specialization.
- To produce graduates who can be effective leaders and educators.
- To provide ample opportunity for intellectual enrichment, professional development and the highest sense of ethics.
- To inculcate a sense of responsibility towards societal needs.

These goals can be achieved only through the right combination of (a) bright and motivated students (b) a vibrant and challenging academic environment (c) a rich and flexible curriculum (d) state-of-the-art research infrastructure and (e) inspiring mentors.

Students

Success of a doctoral programme primarily hinges on attracting and nurturing the doctoral candidates. The rigors of a doctoral programme demand that the student has the following attributes: intelligence, creativity, intense curiosity, adaptability, self-motivation, self-discipline, competitiveness, maturity and high sense of ethics. It is important that the Institute attracts students with these attributes in large numbers for admission to the programme.

Admissions: The programme should be well widely advertised. The admission process should be transparent and flexible.

Financial Support: The current mechanism needs to be expanded to provide for various levels of financial support. This can include a) full fellowship, b) full assistantships as presently the case, c) partial assistantship and d) partial/full fee-waiver. Industry sponsored/self supported students may also be considered.

Student demography: To be a truly international institute, there should be an effort to attract international students to our programme. One may need to look at various models of providing financial support to deserving candidates through global open advertisements.

Academic Environment

An ideal doctoral programme requires that the candidates go through learning in and outside their class-rooms/laboratories. This requires the following:

- State-of-the-art library (physical as well as digital),
- Comfortable and hassle-free living facilities which are also sensitive to married scholars,
- Efficient internet access,
- An open learning environment including regular seminars, discussions, workshops, talks by eminent speakers/professionals that generates intense curiosity,
- Academic responsibility through tutoring and teaching assistantships,
- Opportunities to participate in cutting edge industrial and fundamental research projects,
- Encourage widening of horizon through inter-disciplinary research,
- Personality development through participation in sports/cultural/social/entrepreneurial activities.

Promoting Excellence: The Institute must evolve and support mechanisms to promote excellence amongst the doctoral scholars via incentives in the form of citations/awards/fee-waivers/travel support.

Curriculum

The curriculum should have the right combination of depth and breadth in order to provide the doctoral candidate with sound fundamental training. It should allow flexibility for the student to get exposed to current frontiers of research through advanced courses. The student should have the opportunity and freedom to be exposed to international experience. This may be possible via attending conferences, workshops, collaborative research, transfer of credits. Expert seminars and short courses via web/video conferencing should be actively looked into. There is a need to evolve interdisciplinary courseware to encourage borderless thinking. It would be useful to sensitize the students to issues related to academic ethics and laboratory safety.

Research Infrastructure

This can be broadly classified under three headings: a) personal work area b) computing resources and support and c) laboratory equipment and support.

Personal work area: In order to contemplate, analyze and document, each doctoral scholar needs to be provided a personal work area with basic office support, i.e., furniture, storage space, desk top computer. Space should also be created to encourage interaction between research scholars.

Computing resources and support: In order to carry out high-end research, doctoral candidates will need computing resources. While some of these can be catered to locally, some intense applications will require access to high performance computing platforms and supporting software. There is also a need to provide help desks for

scholars who may need help with use of computing resources. This help can be provided either by hiring specialized man power or help desks manned by trained students. Of course, the latter will have to be done on a rotation basis with proper financial compensation.

Laboratory equipment and support: As the frontiers of research are expanding rapidly, there is a need to upgrade and provide contemporary experimental facilities to our doctoral students. It is also important that attention is paid to avoid/minimize downtime of these facilities. For smooth and efficient conduct of experiments all facilities should be manned by trained personnel.

2. Proposed Curriculum

In the following, the recommendations of the fifth academic programme review committee for PhD curriculum are discussed in detail.

2.1. Credit System and Registration

The fifth academic programme review committee proposes a fully credit-based PhD curriculum. Every academic activity will be evaluated in terms of credits. Academic load is directly converted to credits, as opposed to going through a non-linear mapping. Credits (C) explicitly reflect contact and self-study (SS) hours. The formula for computing credit is given by $C = L + T + P + SS$. Here, $SS = 2L + T + A$, where A indicates additional work. PhD courses use the same credit formula as UG courses.

1. Some PhD courses may have two versions, one for PhD registrants and another for UG registrants. The former will have higher additional work component than the latter. Both courses, however, will have common lecture components.
2. The normal academic load for PhD students is 36 credits per semester.
3. A PhD student may register for 27-45 credits in a regular semester.
4. Four thesis units per semester is prescribed as the normal academic load for students doing no course work. Each thesis unit corresponds to nine credits of work. Each thesis unit receives a satisfactory (S) or unsatisfactory (X) grade.
5. PhD students must register in summer. However, it should not lead to increased tuition fees for the students. They can register for at most 18 credits during summer. These credits can be earned through courses, thesis, or a mix of two.

The credit system is described in more detail in Appendix I.

2.2. Communication Skills

The committee feels that there is a need to expose all the doctoral students to a course focused on Communication Skills. This will be a Pass/Fail course with credits in the range of 2-5 and is in addition to the credits for other course work (outlined in section 2.7). The committee proposes the following three models, one of which may be adopted by the Departments.

Web based: This course has been successfully running for the UG students. It is suggested that a similar course can be run for the PhD students as well. It can be offered to the students in the summer session, so that it does not interfere with their regular course-work in the first year. Details are in Appendix II.

Course module taught by a professional: Professionals from outside the Institute may be invited and to teach this course. This course can take care of skills related to (non-technical) presentations, verbal communications, writing (like synopsis/abstraction etc.). Some of the salient features of this course can be, how to write and structure the content of reports, how to structure an organized thesis, etc. This could also be assisted by a *Language lab*, which would be run by professional(s) and needy students can seek its help as and when required. There are also resources within the Campus to run a *Writing Help Desk*. This may be explored. The number of students is so large that the logistics requirement for these being mandatory is prohibitive.

Seminar courses: It was opined that any course on communication skills that drains on too much faculty resource might not succeed. Perhaps a worthwhile model is that each department offers seminar course with several sub-groups. Each sub-group can have 20-30 registered students and headed by a faculty member. This should be Pass/Fail course where an S/X grade is awarded. The students would take turns to deliver a seminar every week and the mentoring is done by the faculty member.

2.3. Grading Scales

The fifth academic programme review committee recommends the introduction of an A* grade carrying the same level of points as an A grade. However, the A* grade is intended to recognize and encourage outstanding performance in a class. This grade should be used sparingly.

The description of the various letter grades is:

Grade	Weight	Description
A*	10	Outstanding
A	10	Excellent
B	8	Good
C	6	Fair
D	4	Pass
E	2	Fail/Exposure
F	0	Fail

2.4. Examinations

As in the UG programme, it is proposed to hold one mid-semester and one end-semester examination.

2.5. Thesis Grade

The committee also discussed if the S and X grades can be replaced by letter grades so that the gradation of the work can be finer and more accurate than S or X. However, it was felt that justifying a particular letter grade for a thesis unit may not

be easy. It was also felt that multiple thesis units already offer a simple explanation of the grade in a semester e.g., SSSX can clearly tell the student that he/she has accomplished three-quarter of the work expected from him/her. It is recommended that the present practice of awarding S and X grades towards the thesis credits be continued.

2.6.Modular courses

A modular course can be offered for half a semester with only one examination at the end aligned with the mid/end semester examination schedule. Modular courses open up the option of offering an elective course only during one half of a semester. This will bring enormous flexibility in the system. A student registering for a modular course earns half the credits (rounded to the next highest integer) that of a regular course that runs for a full semester.

2.7.Graduation Requirements

Course-work forms an important component of education in the PhD programme. It prepares the student for the research work, lays a strong foundation and also exposes him/her to the various points of views offered by the Instructors teaching the courses. An ideal PhD programme provides adequate opportunity to the scholar for creative and careful research.

The minimum credit requirements for a PhD program are 54 credits of course work (in addition to the Communication Skills Course) and 90 thesis credits. These requirements are same for all students who join the PhD programme, irrespective of their background degree. At present, a student who comes into the programme with a BTech/MSc (in Engineering) has to take a minimum of ten courses. This is a serious discouragement for a student to get into a PhD programme right after BTech/MSc. The committee noted that students with a BTech/MSc who are admitted to the PhD programme are given a direct admission only because they are good students. Further, students with exceptional background should be able to take a partial waiver from this requirement of course work. This will, of course, require approval of the SPGC. The SPGC may bring out policies to implement this including alterations in graduation requirements arising out of these waivers.

Some students may need exposure to under graduate courses to get better prepared for their research. This is especially true for students who may have been trained in one discipline but would now like to pursue research in another discipline. At this point the PhD students cannot take UG courses for credits. There is a need to change this. It is proposed that the student may take up to a maximum of 22 credits (roughly, equivalent to 2 courses) at the undergraduate level.

The current graduation requirement of a minimum CPI of 7.0 discourages students to take additional courses beyond the minimum credits required. Sometimes, students might be working in areas that require them to do additional course work. However, the fear of not doing well and landing up with poor grades dissuades the students to register for more/additional courses.

It is recommended that a student can graduate if s/he acquires a minimum of B grade in at least 27 credits (roughly 3 courses) and a minimum of D grade in the

remaining course credits. The CPI will, of course, be computed on the basis of all the courses that the student registers for. It is hoped that with this model, the students may register for additional courses if their research requires them to do so.

In addition, to graduate with a doctoral degree, the student must (a) pass a comprehensive examination, (b) successfully deliver the state-of-the-art seminar, (c) successfully deliver open seminar and (d) successfully defend the doctoral thesis.

2.7.1. Comprehensive Examination

A comprehensive examination ascertains the candidature of a student for pursuing PhD. To ensure a healthy PhD programme, the format and conduct of this examination is very important. The committee noted that perhaps there is a need to restore the rigour of this examination. The committee discussed several models for the format of the Comprehensive Examination.

1. Status quo: Only the oral examination is mandatory.
2. A mandatory written examination followed by an oral examination.
3. The written examination should be same for all candidates in a certain stream/discipline of a Department.
4. The written comprehensive examination should be a cumulative examination (test the student on 4 to 5 subjects/courses/broad topics).
5. Instead of a written examination, have the student defend a research proposal.
6. The oral examination is fine; however it should be based on testing the student on an students understanding and analysis of an already published research paper that is assigned to the candidate.

The committee resolved that the comprehensive examination, as is detailed at present, in the PG manual should be retained. The committee notes that as per the PG manual, it is the DPGC who should be playing the main role in the conduct of the examination. This should assure uniformity in the conduct of oral examination across the Department and, therefore, more seriousness in the process. Each department must formulate its own format of the examination and submit this to the SPGC/PG Office for reinforcing the implementation. In general, the comprehensive examination should not be held in the first semester. The SPGC can give a waiver in special cases (for example, in cases where course waiver has been granted to students with exceptional background).

2.7.2. State Of The Art (SOTA) Seminar

As per the present practice, the state-of-the-art seminar is to be delivered within six months of student passing his/her comprehensive examination. The successful delivery of the seminar plays the role of an "Admission to Candidacy", and checks whether the student has become adequately familiar with his/her chosen research area. The committee recommends that the current practice should be continued.

2.7.3. Thesis Examination

The committee recommends that the present practice, as detailed in the PG manual, should continue. The only change that is being recommended is regarding the composition of the committee/board for the thesis and oral examination. The committee should include the members of the doctoral committee who mentor/monitor the student's progress.

2.8. Mentoring/Monitoring of Students

At present, the mentoring/monitoring of each PhD student is the sole responsibility of the student's guide/advisor. Ideally, the progress of each student should be monitored by a *doctoral committee*. It is preferable that there should be members common to both, doctoral committee and the committee conducting the comprehensive examination. The doctoral committee should attend the state-of-the art (SOTA) seminar to mentor/monitor the progress of the student. The composition of the doctoral committee is as follows: (a) the advisor(s) (b) a faculty member from the Department and (c) a faculty member from outside the Department. In case a faculty member from outside the department is not available, another faculty member from the department must be included.

The doctoral committee meets the student once a semester preferably between II and V week of the semester. The student makes a presentation on each of the occasions followed up by a short report. The student briefs the committee on the progress made in the past semester and the proposed plan of action for the current semester. The doctoral committee marks its evaluation of the progress of the student on the space provided in the same report. A copy of the report is to be sent to the PG office to be kept in the Student's file.

2.9. Exit Option

Students who do not pass their comprehensive examination (even after the maximum number of attempts that are permitted, as per the present PG manual) may opt for a Masters degree, if available in the concerned discipline/programme, after fulfilling the corresponding requirements. This option will be available to a student even if s/he already has a Masters degree.

2.10. Related Issues

2.10.1. Teaching/Research Assistantship

Participation of graduate students in teaching must be encouraged. Teaching helps in learning as well. Each department should evolve guidelines for the teaching assignment so that the process is effective and fair.

2.10.2. Promoting Excellence

The committee brainstormed on various means that can promote excellence amongst graduate students:

-Fellowships (as opposed to assistantships) can be awarded to some of the exceptional students. The criterion for the same can be laid out by the departments. Each department can recommend 2-3 students.

-We must attract large number of international students to promote diversity in the Campus. Certain scholarships/fee-waivers can be set up for this purpose.

-Annual internal conference to be held at IIT Kanpur across departments. It should be part of academic calendar. Good papers/posters should be recognized. The conference should have a session on new proposals. These are written by students and presented in the conference. The good ones may be internally funded or they can be taken up for further submission to outside agencies.

-Additional travel funds for attending conferences for doctoral students.

-Institution of more awards of excellence for PhD students

-Encourage students to attend Summer/Winter Schools. Schools of certain minimum duration can also be considered for earning credits.

3. Interdisciplinary Research

The research programmes should not be constrained by departmental boundaries. There is a need for clear distinction between an academic department and an academic programme. While the academic programmes in the respective academic departments must continue, one needs to set up liberal programmes that run across more than one department.

We need a flexible framework in which programmes can be created relatively easily and closed also as easily after serving the purpose, with only a limited risk for having created an ineffective programme for short duration

An interdisciplinary programme (IDP) may consist of faculty members across departments who sign up for being associated with the programme in terms of offering the related courses and guiding students. Their joining will require the consent of the Head of the Department they belong to. The administrative structure of the programme will include a PPGC (Programme Post Graduate Committee). The proposal to start an IDP must detail (for the next five years) the teaching and research plan. The IDP becomes functional only if there is a critical mass of faculty resource from various departments. As far as possible, the duplication of courses must be avoided. The efficient utilization of teaching resources must be kept in mind while proposing a course template. The IDP is given a go ahead only for a certain time (let us say, 5 years). It will have to be renewed for intake of new students before this expiry date. In case the renewal is not approved, the IDP continues only to graduate the students that are in the programme.

The IDP should evolve its own admission process, in line with the guidelines of the Institute. Further, it should also be possible for a student of other departments to move to an IDP.

Appendix I: Credit Based System**PhD Credit Subcommittee Report**

The UG credit system has already been proposed. With reference to the PhD programme, there are four main issues:

1. Credit calculation for PhD courses
2. Credit allocation toward thesis work in PhD
3. Credit requirements for the PhD programme
4. Summer credits for PhD students

1. Credit calculation for PhD courses:

The committee debated whether credits for PhD courses should be calculated any differently than the UG courses. Since a PhD student typically registers for four courses, the normal academic load would be 36 credits if the credit calculation is kept the same. While this turns out to be much lower than a typical UG student's academic load, the committee agreed that a PhD student is expected to cultivate higher maturity and carry out self-study outside the routine course curriculum. As a result, a typical PhD student is justified to have lower academic load compared to a UG student. However, the committee recommends that certain PhD courses can be assigned a higher "A" component, if the instructor feels so at the time of proposing the course. Also, a course can be given two different numbers with different "A" components. Essentially, this pair of courses would have a common lecture component, but the registrants of the two courses will be graded separately. The one with the higher "A" component can be open to PhD registrants only and the registered PhD students will have to put more effort in appropriate forms as decided by the instructor to obtain those additional "A" credits. Overall, the committee concludes that the credit calculation formula remains unchanged for a PhD course and the normal semester load for a PhD student is 36 credits, while the minimum is 27 and maximum is 45 (i.e., 25% below and above the normal).

2. Credit allocation toward thesis work in PhD programme:

The committee discussed how the thesis credits should be calculated. The committee first debated whether the current definition of thesis units should continue. It was felt that allowing a student to register for multiple thesis units has the advantage of offering a simple explanation of the grade in a semester e.g., SSSX can clearly tell the student that he/she has accomplished three-quarter of the work expected from him/her. Such an advantage cannot be enjoyed if a student registers for just one lumped thesis unit and receives an S or X grade at the end of the semester. The committee also discussed if the S and X grades can be replaced by letter grades so that the gradation of the work can be finer and more accurate than S or X. However, it was felt that justifying a particular letter grade for a thesis unit may not be easy. At the end the committee concluded to continue with the current scheme of four thesis units per semester as the normal academic load.

Next, the committee debated how credits should be calculated per thesis unit. Number of options were considered. They are listed below.

A. Do away with credits for thesis units. The committee first agreed that the thesis credits won't contribute to the CPI of a PhD student. As a result, it is possible, in theory, to completely decouple credits from thesis units. However, there are practical issues with this model. For example, it is not clear how the academic load of a student would be calculated if he/she registers for a few courses and a few thesis units in a semester.

B. Use the credit formula from UG ARC and assign appropriate values to the "P" and "A" components. However, it was felt that no thesis work can be fully categorized into "P" or "A". In fact, in almost all cases the "A" component is expected to dominate and will vary greatly across departments. Unless a large proportion is allocated to "A", such a credit calculation cannot reflect the actual nature of thesis work. However, the credit formula of UG ARC has a limit on the "A" component and the limit is fairly low. The committee felt that extending this cap to encapsulate thesis credit calculation can lead to confusions.

C. Assign a lumped credit value to each thesis unit. The committee acknowledged the simplicity of this model and agreed that one thesis unit should be nine credits. This leads to a normal academic load of 36 credits in a semester for a student registering for only thesis units. This number was arrived at by taking into account the fact that the normal academic load of a PhD student registering for four courses in a semester would be at least 36 credits. Therefore, the academic load remains more or less uniform throughout the program and does not change much once a student moves on to do his/her thesis work.

3. Credit requirements for PhD programme:

- A. PhD after BTech/MSc: Minimum 54 credits of course work and minimum 90 credits of thesis work
- B. PhD after MTech: Minimum 54 credits of course work and minimum 90 credits of thesis work
- C. PhD after MSc/MA/MPhil: Minimum 54 credits of course work and minimum 90 credits of thesis work

4. Summer credits for PhD students:

All PhD students are expected to conduct research in the Summer Session. However, at present there is no mechanism to monitor/evaluate their progress. It is recommended that a PhD student must register in the Summer. The registration may be for a maximum of 18 credits during the summer session. This is equivalent to two thesis units. These credits can be obtained by taking courses or by registering for thesis units or a mix of these two.

Appendix II: Course on Composition (Communication Skills)

This course is based on a lot of on-line exercises. It consists of one lecture per week which is to initiate the students into the subject matter to be covered during the week. In addition there is to be a two hour lab every week where exercises are to be administered on a computer. An instructor and several tutors will be required to run the lab. After the practice session, students are to be given assignments on the subject matter covered in the laboratory. Evaluation is to be based on an online half-hour test at the end of each module. As suggested in the ARC report, the course is supported by a parallel help desk where students can go and seek assistance.

(i) It is suggested that senior PhD students from all the departments be involved in running the lab as they also stand to benefit from this.

(ii) It may not be possible to run the course for the entire batch in one semester due to logistic reasons. So the senate may consider offering the course in the third and the fourth semester.

Course structure:

Module 1 - Introduction to words: word derivation; context sensitivity in word meaning; synonyms and antonyms; homonyms; homophones; pronunciation of same spelling words according to the context; vocabulary building techniques; using a thesaurus for choosing a proper word; euphemistic words and collocations; using idiomatic expressions (3 lab sessions)

Module 2 - Introduction to sentences: constructing grammatically correct sentences; use of appropriate articles, tenses, parallelism, agreement and modifiers; correcting incorrect sentences; use of active, passive, direct and indirect speech; improving a sentence with an alternate word or an alternate structure; simplifying and building complex sentences (3 lab sessions)

Module 3 - Mind mapping and idea organisation: reading skills and techniques; reading comprehension; deciphering an idea - may include giving title to a written paragraph; identifying thematically incoherent sentences in a paragraph; rewriting a paragraph in one's own words (paraphrasing); organising and presenting ideas in a logical sequence; understanding structure of arguments; common flaws in argumentation; coherence of composition; correcting jumbled paragraphs (3 lab sessions)

Module 4 - Paragraph writing: Guided composition; writing within a word/sentence limit; Editing with alternate words/phrases; situational writing; developing appropriate arguments in composing a paragraph (3 lab sessions)

Module 5 - Story/ Essay/Thematic/Narrative/Scientific writing (2 lab sessions)

Total number of labs = 14

Appendix III: The committee members

Dr. Sanjay Mittal, AE, Chairperson
Dr. Peeyush Mehta*, IME
Dr. CS Upadhyay, AE
Dr. K. Subramaniam, BSBE
Dr. V. Chandrasekhar*, CHM
Dr. Goutam Deo, CHE
Dr. M.S. Kalra, ME
Dr. Rajiv Shekhar*, MME
Dr. Partha Chakraborty, CE
Dr. A.K. Chaturvedi, EE
Dr. Mainak Chaudhuri, CSE
Dr. Debasis Kundu, MTH
Dr. Manoj Harbola, PHY
Dr. Suchitra Mathur, HSS

*In view of these members being on leave from the Institute, they nominated the following members:

Dr. Raghu Nandan Sengupta, IME
Dr. Anish Upadhyay, MSE
Dr. K. Srihari, CHM

Dr. PK Saini, AR(AA), Secretary

2.7 Graduation Requirements for Regular MTech Program:**(I) Credit Requirements:**

For regular MTech Program, the distribution of total 144 credits (or 4 semester normal load) proposed by ARC is:

- *Minimum course-work: 54 credits (or 1.5 normal semester load), Maximum 22 credits at UG level.*
- *Minimum thesis work: 81 credits (or 2.25 normal semester load),*
- *Distribution of 09 credits (or 0.25 normal semester load) is left to the Department.*

After extensive discussion, ME Dept felt that, like the present MTech program, the distribution of 0.75 normal semester load should be left to the Department. Thus, it proposes:

- *Minimum course-work: 54 credits (or 1.5 normal semester load),*
- *Minimum thesis work: 63 credits (or 1.75 normal semester load),*
- *Distribution of 27 credits (or 0.75 normal semester load) is left to the Department.*

(II) Performance Requirement:

ME Dept agrees with the following performance requirement (for regular MTech Program) proposed by ARC:

Minimum 'B' or higher grade in at least 27 course credits (i.e., in three 3-lecture courses) and at least 'D' grade in the remaining course credits.

2.8 Change of Program to the Dual Degree MTech-PhD Program:

ARC has proposed that the students in MTech program completing at least 2 semesters and having the CPI equal to or greater than 7 should have the option to change their program to the dual degree MTech-PhD program. (The details of this program are to be worked out by each Department and to be approved by the SPGC).

ME Dept feels that such students should *also* be given the option to change their program to the regular PhD program (and not just to the dual degree MTech-PhD program) as is being done presently.

2.10 APEC Rules:

ME Dept agrees with the following APEC rules for MTech Program proposed by ARC:

- *A student goes on probation if s/he fails to accumulate 'B' or higher grade in at least 30% of the cumulative course credits upto that point.*
- *The program of a student gets terminated if s/he is on probation and fails to accumulate at least 20% of cumulative course credits upto that point with 'B' or higher grade.*

ME Dept, however, feels that the additional APEC rules should be formulated for the students getting 'X' grades in the thesis units.

P.M. Dixit

August 17, 2013

**Department of Mechanical Engineering
Indian Institute of Technology Kanpur**

**Feedback of ME Dept on ARC Report for PhD Program
(Based on the Discussion held in Faculty Meetings of April 6 and May 3)**

2.1 Credit System and Registration:

For PhD Program, ME Dept agrees with:

- Credit formula of $C=3L+2T+P+A$, where A indicates additional work. (Thus, a three-lecture PG course will have 9 credits),
- 9 credits for each thesis unit,
- 36 credits (18 in Summer Term) as the normal academic load per semester with the limits for the underload and overload being 27-45.

2.2 Communication Skills Course:

For PhD Program, ME Dept agrees that there should be a communication skills course (of 2-5 credits with pass/fail option), in addition to other course work and it should be taught by a Professional.

2.3 Grading Scales:

For PhD Program, ME Dept agrees that the grade 'A*' (with the same 10 points as grade 'A') should be introduced to recognize and encourage outstanding performance in a class. (The grade should be used sparingly).

2.5 Thesis Grade:

For PhD Program, ME Dept agrees that the thesis grade for each thesis unit (9 credits) should be S (satisfactory) or X (unsatisfactory).

2.7 Graduation Requirements:**(I) Credit Requirements:**

- A *majority* of the faculty members support 6 courses for the students with MTech background with an automatic waiver of 2 courses to the students from IITs/IISc. The reasons for supporting more courses are: It equips the student better for research by providing a strong foundation.
 - Regarding waiver to other students, some faculty members suggested that the waiver should be allowed after the supervisor is chosen.
 - Those not supporting 6 courses expressed the following apprehensions about the proposed increase in the course-work: (i) More course-work would reduce the time available for research, (ii) Since most of the other IITs/IISc have less coursework, it would discourage students from applying to IIT Kanpur thereby reducing the number of PhD Applications.
 - The department feels that number of courses for the students with BTech/MSc background should be 8-10.
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- The Department is not in favour of allowing UG Courses to be credited by PhD students with MTech background.

(II) Performance Requirement:

- A *majority* of the faculty members support to retain the existing CPI requirement of 7.0. (This includes faculty members supporting both 6 as well as 4 courses).
- Some faculty members suggested that CPI of 7.0 should be calculated *only* for the 4 courses with the best grades. Some others suggested that beyond 6 courses, the students should be given an option of taking courses with 'Pass/Fail' option. While some others suggested that students with MTech background should be allowed to take the comprehensive examination after 4 courses while those with BTech background should be allowed after 8 courses.

2.8 Mentoring/Monitoring of Students:

The Department supports the idea of the *Doctoral Committee* for each PhD student with the following modifications:

- The two members of the *Doctoral Committee*, besides the thesis supervisor(s), could both be from the Department or both from outside the Department or one from the Department and one from outside the Department.
- The Committee should be proposed by the Thesis Supervisor(s).
- This Committee should be different from the Comprehensive Board.
- It should be possible to change the members of the Doctoral Committee.
- The Committee should monitor the students' progress starting from the SOTA till the submission of the thesis. Thus, the Committee's input can be used for the Scholarship as well as Academic Extensions.
- The presentation by the student to the Committee should be once in a year. The Evaluation Report should stay in the Department.
- The presentation should be towards the end of the year. It was suggested that the Department should explore the possibility of identifying a suitable time slot (of appropriate duration) in which all the presentations could be arranged.

Some faculty members suggested that the members of the Doctoral Committee should be made members of the Oral Board, if they are available during that time.

2.9 Exit Option:

Due to lack of time, this issue could not be discussed.

P.M. Dixit
May 3, 2012
