

Ordinances
for
Master of Technology (M.Tech.) and
Doctor of Philosophy (Ph.D.) Programme
in
Nano Science and Technology



Aryabhatta Centre for Nanoscience & Nanotechnology
School of Engineering & Technology

ARYABHATTA KNOWLEDGE UNIVERSITY,
PATNA

ARYABHATTA KNOWLEDGE UNIVERSITY, PATNA

Ordinance for Admission to M.Tech. (*Nano Science & Technology*) programme in the School of Engineering & Technology

Nomenclature:

This ordinance may be called as "Ordinance for Admission to M.Tech. (*Nano Science & Technology*) programme in the School of Engineering & Technology" of Aryabhata Knowledge University, Patna.

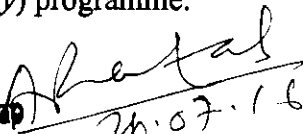
- O.1. Eligibility for admission, admission policy and procedure shall be decided from time to time by the Court of the Aryabhata Knowledge University, Patna (AKU Patna) hereafter mentioned as University.
- O.2. The normal duration of the M.Tech. (*Nano Science & Technology*) programme, including project work, shall be *four semesters* (two years). The duration can be extended to a maximum of six semesters (3 academic years). The maximum limit can be extended by 1 or 2 semester subject to the approval of university on case to case basis. Candidates may be permitted to do their project work in the industry and other approved organizations.
- O.3. Award of M.Tech. (*Nano Science & Technology*) shall be in accordance with the regulations of the University.
- O.4. The University will conduct this course at its headquarters and in any viable institutions affiliated to this University from the Session 2014-16.
- O.5. The Court of the University has the right to modify any regulations stated from time to time.

O.6. Admission:

- a. A candidate seeking admission to M.Tech. (*Nano Science & Technology*) Semester-I must have:
 - i. Bachelor's degree in Nanotechnology/Electrical/Mechanical/Electronics/Instrumentation/Chemical/Biochemical Engineering/ Medical/Veterinary Sciences or equivalent, with not less than or 60% aggregate marks for General Category and 55% for all reserved categories in the absolute system or equivalent grade.

OR

 - ii. M.Sc. or equivalent degree in Physics/Chemistry/Electronics/Electronics Science/Material Science/ Nanoscience/Biotechnology/Agriculture, with not less than 55% aggregate marks for General Category and 50% for all reserved categories in the absolute system or equivalent grade.
- b. Candidates who have qualified for the award of the Bachelor's degree in Engineering / Technology or Master's degree in Science in above mentioned subjects through distance education/ correspondence mode are also eligible to apply for admission to the M.Tech. (*Nano Science & Technology*) programme.


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- c. Notwithstanding what has been stated in O.6a above, applications from *candidates sponsored* by organizations recognized by the Court, and applications from *foreign nationals* received through proper channel, may be considered for admission to the M.Tech. (*Nano Science & Technology*) programme without *University M.Tech. Entrance Test*. Their admission shall, however, be governed by the regulations prescribed by the Court.
- d. Candidates from Government / Public Sector Organizations with Associate Membership qualification (AMIE, AESI, AMIM, AMIChemE, AMIETE) and having two years of experience, can be permitted to apply for admission to M.Tech. (*Nano Science & Technology*) under sponsored programme without *University M.Tech. Entrance Test*.
- e. The reservation of the seats for this course shall be as per the reservation rules of the Govt. of Bihar.
- f. Seats left unfulfilled in any of the reserved category by reason of the fact that eligible candidates are not available shall be filled up admitting applicants from amongst candidates available in other categories in order of ascending categories.
- g. The total number of seats for the M.Tech. (*Nano Science & Technology*) shall be 20 (twenty).

O.7. Disqualification:

No applicant shall be admitted to this course who has not applied for admission within the notified time.

- a. The admitted students will have to get themselves registered within a specified time notified by the university.
- b. No such applicant shall be admitted who in the opinion of the Vice Chancellor is not a fit candidate to be admitted to guard the best interest of the University.
- c. The admission of any student admitted to M.Tech. (*Nano Science & Technology*) shall be cancelled if it is found at any later point of time that any document submitted or statement made by him/her in support of his/her admission is forge or false, the concern student will be solely liable for the act.
- d. No candidate shall be allowed to register as a student in any course during the academic years of his/her study for M.Tech. (*Nano Science & Technology*).

O.8. Fee Structure:

The fee structure for the M.Tech. (*Nano Science & Technology*) will be applicable as per the decision of the university from time to time.

Sl.No.	Description	Fee (Rs.)	Remarks
1.	Admission Fee	5000.00	One Time
2.	Development Fee	10000.00	One Time at the time of admission
3.	Tuition Fee	12000.00	Per Semester
4.	Student Activity Fee	500.00	Per Semester
5.	Caution Money (Refundable)	2000.00	One Time at the time of admission
6.	Registration Fee	2000.00	One Time at the time of admission
7.	Examination Fee	2000.00	Per Semester
8.	Thesis Evaluation Fee	5000.00	At the time of submission of Thesis
9.	Student Welfare Fund	1000.00	Per Annum

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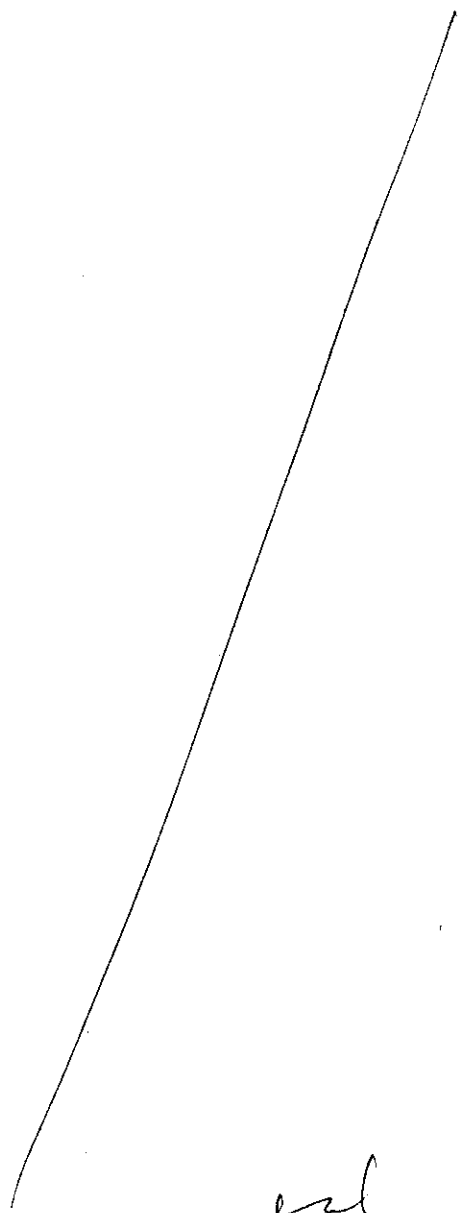
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Prof. (Dr.) Ajay Prasad
Registrar

- i. The excess fee realized/charged from the students of the above mentioned courses will be adjusted in the forthcoming (next) semesters.
- ii. The fee structure may be revised from time to time by the Vice-Chancellor with the prior permission of the Chancellor, Universities of Bihar.

O.9. Special Provisions:

The Vice chancellor shall have power to relax, with the approval of the Chancellor, Universities of Bihar and the State Govt., any criteria and increase seats beyond the usual number of seats.



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ARYABHATTA KNOWLEDGE UNIVERSITY, PATNA

Ordinance for Admission to Ph.D. (*Nano Science & Technology*) program in the School of Engineering & Technology

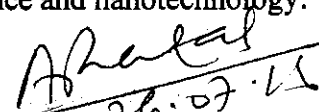
Nomenclature:

This ordinance may be called as "Ordinance for Admission to Ph.D. (*Nano Science & Technology*) programme in the School of Engineering & Technology" of Aryabhata Knowledge University, Patna.

- O.1. Eligibility for admission, admission policy and procedure shall be decided from time to time by the Court of the Aryabhata Knowledge University, Patna (AKU Patna) hereafter mentioned as University.
- O.2. The normal duration of the Ph.D. (*Nano Science & Technology*) programme, including project work, shall be minimum *six semesters* (three years). The duration can be extended to a maximum of ten semesters (5 years). The maximum limit can be extended with the permission of competent authority on +1 and +1 year basis up to 7 years maximum. Candidates may be permitted to do their project work in the industry and other approved organizations.
- O.3. Award of Ph.D. (*Nano Science & Technology*) shall be in accordance with the regulations of the University.
- O.4. The University will conduct this course at its headquarters and in any viable institutions affiliated to this University from the Session 2014-16.
- O.5. The Court of the University has the right to modify any regulations stated from time to time.

O.6. Admission:

- a. There are two possible categories of admission in Ph.D. (*Nano Science & Technology*) programme:
 - i. **Full-time doctoral students:** Such students are entirely focused on carrying out their coursework, research, and other requirements of the Ph.D. Program at the University or University recognized institutions.
 - ii. **Part-time doctoral students:** Such students are either full-time employees (*e.g.*, faculty, technical staff or project staff not covered under 'i' (see Rules in Annexure-I of the University), or employees of other organizations (such as Constituent Colleges, Universities, recognized R&D Centers, Industries, *etc.*). They will be exempted from PRT and will be permitted to proceed at a slower pace in their Ph.D. Program at the University.
- b. A candidate seeking admission to Ph.D. (*Nano Science & Technology*) should possess either i, ii or iii, to pursue research in nanoscience and nanotechnology:


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- i. M.E./ M.Tech./ M.S. or equivalent degree with a minimum of 55% marks in Nanotechnology/Electrical/Mechanical/Electronics/Instrumentation/ Chemical/Biochemical Engineering.
 - ii. M.Sc. (Nanoscience/Nanotechnology) or an equivalent degree in any branch of Physical/Chemical/Material Science/Biological/Agricultural sciences with a minimum of 55% marks.
 - iii. Master degree in any branch of Medical (Allopathic, Ayurveda, Homeopathy or Unani)/ Veterinary sciences or an equivalent degree with a minimum of 55% marks.
- b. Candidates who have qualified for the award of the M.Sc. degree in Science in above mentioned subjects through distance education/ correspondence mode are also eligible to apply for admission to the Ph.D. (*Nano Science & Technology*) programme.
 - c. M.Tech. (*Nano Science & Technology*) candidates from AKU with a minimum CGPA of 7.5 for General category, and 7 in case of SC/STs, are eligible for admission in Ph.D. (*Nano Science & Technology*) programme without appearing in the **University Ph.D. Entrance Test** and they will be exempted from the coursework if he/she wants to continue to the Ph.D. programme. Such case(s) will be considered as **Integrated M.Tech.-Ph.D. programme**.
 - d. Candidates having Master degree in Science/Engineering/Technology with a minimum of 55% marks and a valid UGC-NET or DST-INSPIRE score will be exempted from the **University Ph.D. Entrance Test**.
 - e. The reservation of the seats for this course shall be as per the reservation rules of the Govt. of Bihar.
 - f. Seats left unfulfilled in any of the reserved category by reason of the fact that eligible candidates are not available shall be filled up admitting applicants from amongst candidates available in other categories in order of ascending categories.
 - g. The total number of seats for the Ph.D. (*Nano Science & Technology*) shall be notified time-to-time (includes reservation as per Government of Bihar norms).

O.7. Disqualification:

- a. No applicant shall be admitted to this course who has not applied for admission within the notified time.
- b. The admitted students will have to get themselves registered within a specified time notified by the university.
- c. No such applicant shall be admitted who in the opinion of the Vice Chancellor is not a fit candidate to be admitted to guard the best interest of the University.
- d. The admission of any student admitted to Ph.D. (*Nano Science & Technology*) shall be cancelled if it is found at any later point of time that any document submitted or statement made by him/her in support of his/her admission is forge or false, the concern student will be solely liable for the act.

- e. No candidate shall be allowed to register as a student in any course during the academic years of his/her study for Ph.D. (*Nano Science & Technology*).

O.8. Fee Structure:

The fee structure for the Ph.D. (*Nano Science & Technology*) will be applicable as per the decision of the university from time to time.

Sl.No.	Description	Fee (Rs.)	Remarks
1.	Admission Fee	5000.00	One Time
2.	Development Fee	10000.00	One Time at the time of admission
3.	Tuition Fee	12000.00	Per Semester (1 st and 2 nd Semester)
		6000.00	Per Semester (3 rd Semester onwards)
4.	Student Activity Fee	500.00	Per Semester
5.	Caution Money (Refundable)	2000.00	One Time at the time of admission
6.	Registration Fee	2000.00	One Time at the time of admission
7.	Examination Fee	2000.00	Per Semester
8.	Thesis Evaluation Fee	5000.00	At the time of submission of Thesis
9.	Student Welfare Fund	1000.00	Per Annum

- i. The excess fee realized/charged from the students of the above mentioned courses will be adjusted in the forthcoming (next) semesters.
- ii. The fee structure may be revised from time to time by the Vice-Chancellor with the prior permission of the Chancellor, Universities of Bihar.

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ARYABHATTA KNOWLEDGE UNIVERSITY, PATNA

Aryabhata Centre for Nanoscience & Nanotechnology

Post-Graduate & Ph.D. Programme

Academic Vision

The challenges posed by nanoscience and nanotechnology cannot be answered solely by principles and techniques derived solely from a single science or a technology discipline. Instead, it requires the contributions of diverse inter-related fields, but is not limited to, physics, chemistry, biology and engineering. Potential applications at the nanoscale may well provide for unprecedented benefits, but will require an even more diverse set of methodologies, especially for applications in medicine, agriculture, environment and electronics. Keeping in view the prodigious potentials of this upcoming area, Aryabhata Knowledge University, Patna has initiated postgraduate (M.Tech. or M.S./M.Sc.) and research (Ph.D.) programmes in the area of nanoscience and nanotechnology. The rapid development and the exponential possibility of commercialization of the nano-based products warrants appropriate as well as acuminate development of human resource in this field. It is expected that this venture shall have major impact on the educational infrastructure as well as society too in the coming future.

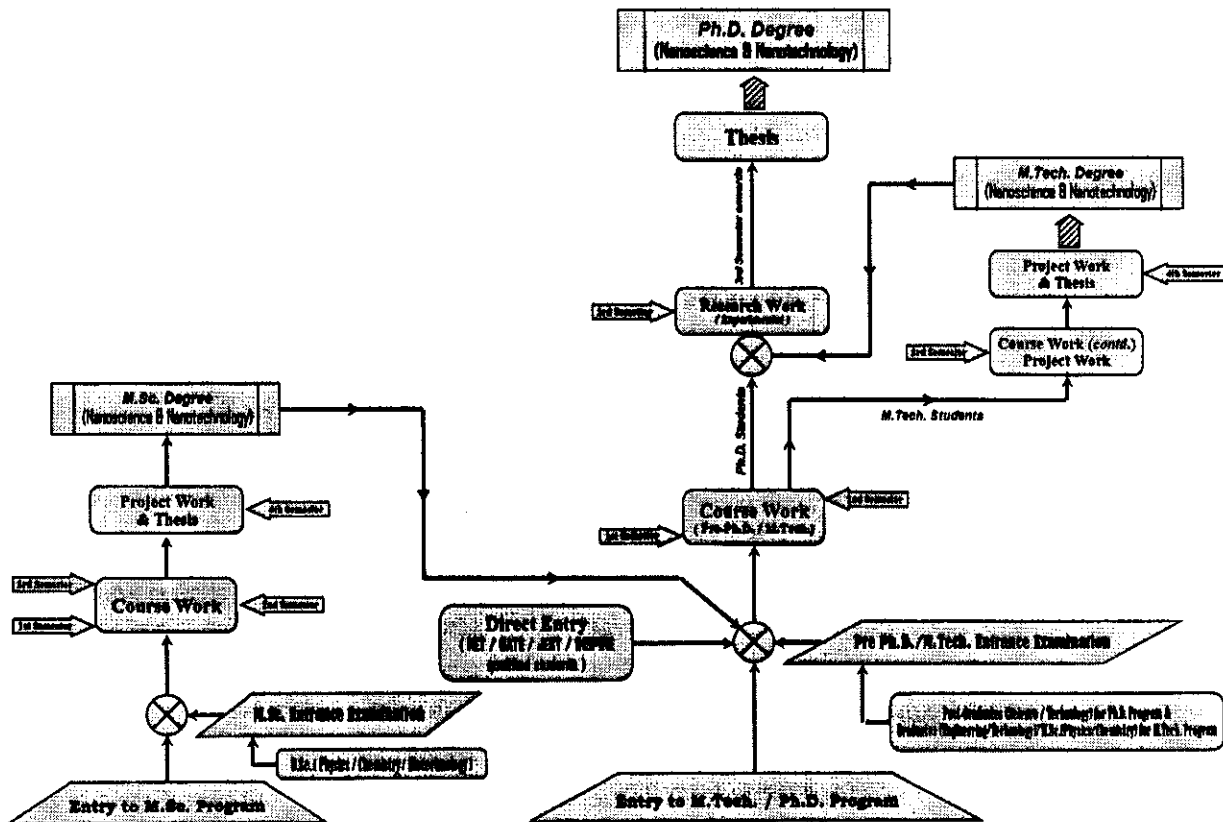
Academic Programme: Aryabhata Centre for Nanoscience & Nanotechnology proposes following academic programmes:

- M.Sc. in Nano Science & Technology.
- M.Tech. in Nano Science & Technology.
- Ph.D. in Nano Science & Technology.

The curricula are designed to ensure in-depth knowledge in the area of specialization together with breadth of exposure and intellectual enrichment and to prepare the students for high level professional research and development career in national laboratories, universities and industries. ACNN recognizes that modern scientific research is carried out in a domain without any boundaries. The postgraduate students and research scholars will flourish in the ambiance of this scientific culture. In this perspective, it is expected that faculty members would try to establish research laboratory in inter-disciplinary areas while discharging their teaching and other duties. ACNN will demand dedication and commitment from its students. They must be responsible for their performance and utilize their time at AKU. Their primary aim is to build them self to take up challenging research and teaching assignments in universities, R&D laboratories and various industries. They should be aware that their talent is recognized and totally supported by the society with resources. Therefore, they must develop a sense of indebtedness to the society at large. ACNN will consciously endeavor to create an atmosphere of fraternity, cooperation and a sense of social responsibility. A self-explanatory flowchart as shown under illustrates the details of different academic programmes and their implementation. The *benefits* of these programmes in Nanoscience & Nanotechnology to the university are many-fold:

- (i) It meets the challenge of devising educational infrastructure for a new brand of students whose training needs to go beyond traditional departmental boundaries.

- (ii) It provides a natural mechanism for forging collaborative endeavors between faculty and labs of various distinct departments and schools, via shared supervision of the students and
- (iii) It provides a response to the recent rapid growth in national/international funding and employment opportunities in Nanoscience, Nanotechnology, and their applications.



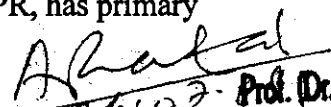
Thrust Area of Research

This major focus of this centre is to carry out researches in the frontier thrust areas of nanotechnology, which include:

- ☺ Biomedical sciences
- ☺ Agriculture sector
- ☺ Energy & Environment
- ☺ Healthcare & Cosmetology
- ☺ Nanoceramics and Nanocomposites
- ☺ Nanobiotechnology
- ☺ Food Technology
- ☺ Defence need
- ☺ Nanoelectronics
- ☺ Functional Nanomaterials

Preamble

1. The name "Aryabhatta Knowledge University" will be abbreviated as "the University" in this document.
2. For the purpose of this document, Aryabhatta Centre for Nanoscience & Nanotechnology (ACNN) shall be considered as equivalent to University Department, and Centre Head as equivalent to Department Chair.
3. The Chairman, University Level Committee for Post-Graduate Programmes and Research in Nano Science & Technology (or another title, as appointed by the Vice Chancellor with responsibilities stated herein), hereafter referred to as Dean, PGPR, has primary


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responsibility over all postgraduate (M.Tech. or M.S./M.Sc.) and research (Ph.D.) programs in Nano Science & Technology in the University.

4. The Dean, PGPR shall work closely with the Head, ACNN to ensure the successful conduct of all postgraduate and research programs, and shall report all major actions to the Vice Chancellor for approval.
5. The award of Master (M.Tech./M.S./M.Sc.) and/or Ph.D. Degree shall be in accordance with the Policies and Procedures of the University, as well as other Ordinances, Rules, and Regulations of the University.

Policies

1. Students have to complete a minimum post-graduate/doctoral level coursework of specified credits and independent dissertation and/or research leading up to a successful defense of a dissertation work for postgraduate programmes (M.Sc./M.Tech.) and Doctoral thesis are required for the award of the Ph.D. degree. However, the student having M.Tech. (*Nano Science & Technology*) from this university may be exempted from the coursework if he/she want to continue to the Ph.D. program.
2. The Doctoral Committee may prescribe more course work than the minimum credits prescribed whenever it is required. This is over and above the credits requirements specified above.
3. The University alone will have the power to add/make amendments to the Policies as deemed fit from time to time.
4. All students (M.Tech./M.S./M.Sc. and/or Ph.D. Courses) shall remain under the direct control and discipline of the Head/Chairman of ACNN.

Admission Procedure (Ph.D. programme)

Candidates have to choose any one of the following papers for admission to Ph.D. programme depending upon their choice.

- Physical sciences
- Chemical sciences
- Biological sciences
- Engineering streams

The question paper will be divided into two parts of 50 marks each. Part-A will consist of fifty multiple choice questions based on general/scientific awareness type and Part-B will fifty multiple choice/ten short answer type questions on the subject. The syllabus, model questions and suggested reference shall be provided in the Information Brochure/University website.

No. of Seats: Notify time-to-time (includes reservation as per Government of Bihar norms).

1. Authorization to offer Ph.D.

ACNN of the University, intending to offer a Ph.D. Program is required to make a Ph.D. approval application to the Dean, PGPR through the Head, ACNN. Such an application must include faculty who will be serving as Ph.D. advisors and their areas of specialization, suggested course work structure, and other faculty from within and outside the University who can assist with the Ph.D. program together with all of their specialties. The Dean, PGPR will forward the application with his or her recommendation to the Vice Chancellor for approval.

If approved, the Ph.D. Program will be known as: Ph.D. in Nano Science and Technology (Area of Specialization). For example, if the specialization in Ph.D. is being offered in Healthcare, it will be called Ph.D. in Nano Science and Technology (Healthcare). However, the Degree Certificate will mention only the title of the Thesis and the Aryabhata Centre for

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Nanoscience & Nanotechnology in which the student is registered. The University will encourage interdepartmental/interdisciplinary/inter-institutional/applied research.

2. Admission

2.1 Eligibility Criteria

The applicant should possess either (a), (b) or (c), to pursue research in nanoscience and nanotechnology (see the Thrust Area of Research):

- a. M.E./ M.Tech./ M.S. or equivalent degree with a minimum of 55% marks.
- b. M.Sc.(in Nanoscience/Nanotechnology) or an equivalent degree in any branch of Physical/Chemical/Biological/Agricultural sciences with a minimum of 55% marks.
- c. Master degree in any branch of Medical (Allopathic, Ayurveda, Homeopathy or Unani)/ Veterinary sciences or an equivalent degree with a minimum of 55% marks.

2.2 Application

The call for applications will generally be posted twice a year on the University website, accessible via <http://akubihar.org>. However, the University will accept applications throughout the year. Each Applicant should submit, in addition to his or her degree certificates, grade/ mark sheets and other documents mentioned in the application, a Statement of Purpose (describing his or her research interests) together with the completed application, and mention up to three areas of interest in the order of preference for Ph.D. programme. Incomplete application form will be rejected.

2.3 Entrance Test and Interview

The Dean, PGPR will screen the applications and call the selected applicants for Pre-Ph.D. entrance test followed by personal interview. The Selection Committee constituted by the Vice-Chancellor will examine the applicants' background and aptitude for research. Based upon the Pre-Ph.D. entrance test/fellowships like UGC/CSIR-NET JRF, DBT-JRF, ICMRJRF, INSPIRE or any other equivalent fellowships and interview performance and prior academic record, the Committee shall give its recommendation to the Dean, PGPR who will finalize the admission and notify (preferably in the university website) the selected applicants the date of joining. All prospective thesis advisors may be involved in the selection process and their consent obtained before being appointed as the Thesis Advisor for any applicant. Whenever required, the Committee may request additional evidence, such as letters of recommendation, copies of claimed publications, etc. The Institute shall not provide any TA/DA or accommodation for attending the interview. The selected candidates will receive the offer letter containing also the last date for joining shortly after the interview.

2.4 Categories of Admission

There are two possible categories of admission for any applicant:

- a. **Full-time doctoral students:** Such students are entirely focused on carrying out their coursework, research, and other requirements of the Ph.D. Program at the University or University recognized institutions. Students admitted under this category may be employed as project staff on a research project; however, the research project must have the student's thesis advisor as either a PI or a Co-PI, and the subject areas of the research project and the student's proposed doctoral research should overlap.
- b. **Part-time doctoral students:** Such students are either full-time employees (e.g., faculty, technical staff or project staff not covered under (a); see Rules in Annexure-I) of the University, or employees of other organizations (such as Constituent Colleges, Universities,

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recognized R&D Centers, Industries, *etc.*). They will be exempted from PRT and will be permitted to proceed at a slower pace in their Ph.D. Program at the University.

3. Degree Requirements

3.1 Thesis Advisor and Doctoral Committee

Every doctoral student will be given a chance to give their preference, in a prescribed proforma (**Appendix-I**), for the Thesis Advisor/Supervisor and/or Co-Advisor/Supervisor. Accordingly, each of which will be assigned a Thesis Advisor/Supervisor and/or Co-Advisor/Supervisor and a Doctoral Committee by the Dean, PGPR at the beginning of Second Semester. The Thesis Advisor shall be a regular or emeritus faculty member of the University with a Ph.D. Degree and established research record. Adjunct faculty members or faculty members/scientists working in other organizations having requisite qualifications can be involved as Co-Advisors. If the faculty member from ACNN is without sufficient Post-Doctoral experience, a senior faculty member will be associated as a Co-Advisor. The Doctoral Committee will consist of the Thesis Advisor, a Convener to be appointed by the Dean, PGPR, and a faculty member from ACNN. In addition, if in case the Doctoral Student has been assigned a Co-Advisor, the Co-Advisor automatically becomes a member of the Doctoral Committee. Each member of the Doctoral Committee must necessarily have a Ph.D. degree. The Doctoral Committee will be responsible for all academic matters connected with the Ph.D. Program of the Doctoral Student, including prescribing the Course Work, monitoring the progress of the Doctoral Student, and suggesting the panel of examiners for Comprehensive Oral Examination/Thesis Evaluation *etc.* Generally, the number of doctoral students assigned to a faculty member according to the UGC norm. However, this number may be increased to eight at a time, under exceptional cases.

3.2 Course Work

A doctoral student is expected to complete the prescribed courses (**Appendix-II**) as part of his or her doctoral program. The course work for a doctoral student is proposed by the Doctoral Student's Thesis Advisor, keeping in view the Doctoral Student's research interests, background and preparation needed to carry out the research. The course work so proposed will be submitted by the Doctoral Committee of the student to the Dean, PGPR for approval. All the courses shall be University approved courses. It is necessary that they earn a minimum of "C" Grade in all the courses within a year (two semesters) of Pre-Ph.D. coursework of 28 (twenty eight) credits.

3.3 Attendance Requirement

1. All activities prescribed under these regulations and listed by the course faculty members in their respective course outlines are compulsory for all students pursuing the courses. No exemption will be given to any student from attendance except on account of serious personal illness or accident or family calamity that may genuinely prevent a student from attending a particular session or a few sessions. However, such unexpected absence from classes and other activities will be required to be condoned by the Dean, PGPR.
2. Student attendance in a course should be a minimum of 75%.
3. A student shall be entitled to the following types of leave during the academic year counted from the date of commencement of the session concerned as prescribed in the Academic Calendar of the University

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Nature of Leave	Maximum number of Days	Sanctioning Authority
Casual leave	12	Head of the Centre
Medical leave*	10	Head of the Centre

*Provided that the application is supported by a certificate from a Registered Medical Practitioner or recognized Hospital.

- N.B.** (i) Leave not availed of by a student in the first year shall not accumulate. The concerned Department/Centre will maintain the leave record.
- (ii) If a student is absent without permission for more than one month his/her name will be removed from the rolls.
- (iii) A student is not entitled to any vacation on account of inter-semester break, summer and winter vacations.

3.4 Course Evaluation

- The performance of every student in each course will be evaluated as follows:
 - Internal assessment (Mid-term evaluation) by the course faculty member(s) based on continuous assessment, for 50% of the marks for the course; and
 - End-Semester assessment (End-term examination) will be conducted by the University for 50% of the marks for the course.
 - All the examination (Mid- and End-terms) related works including setting of question papers, answer books evaluation, etc. shall be performed by the concerned faculty.
- Internal Assessment:**
Mid-term evaluation will be based on the performances of a student in quiz, viva, seminar, assignment, class tests, mid-semester exams, etc., as prescribed by concerned faculty.
- Internal Assessment for Practical Subjects:**
 - One mid-term practical test/viva will be conducted per semester totaling to 50% internal marks for practical.
 - In "Continuous evaluation" students shall be evaluated in a continuous manner for their involvement in the practical, aptitude for learning, completion of practical related assignments, regularity in the practicals and record keeping.
- End-Semester Assessment:**
 - The end-term examination by the University for 50% of the evaluation for the course will be through written paper or practical test or oral test or presentation by the student or a combination of any two or more of these.
 - In order to earn the credit in a course a student has to obtain grade other than 'F'.
- Performance at Internal and End-Semester Examinations:**
 - Minimum performance with respect to mid-term marks as well as end-term examination will be an important consideration for passing a course. Details of minimum percentage of marks to be obtained in the examinations are as follows

Minimum marks in End-term Exam per subject	Minimum overall marks per subject
40%	50%

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- (ii) If a candidate obtains minimum required marks per subject but fails to obtain minimum required overall marks, he/she has to repeat the End-term examination till the minimum required overall marks are obtained.
- (iii) For theoretical subjects, the final grades will be awarded on the basis of Teacher's Assessment, Mid-Semester Examination and End-Semester Examination, according to the weightage given below:

Teacher's Assessment (Attendance, home assignment, assignments, class tests, tutorials, etc.)	Mid-Semester Examination	End-Semester Examination
20	30	50

3.5 Grading System

- (i) The total marks in each course will be converted to a seven-scale letter grade on a ten-point scale to assess the performance of students in the various categories (subject, project, etc.) as per the following scheme:

Grading Scheme:

Description	Letter grade	Grade points per Credit	Range of marks (%)
Excellent	A+	10	≥ 90
Very good	A	9	≥ 80 & < 90
Good	B	8	≥ 70 & < 80
Fair	C	7	≥ 60 & < 70
Pass	P	6	≥ 50 & < 60
Fail	F	0	< 50; for theory component < 50; for laboratory component

The exceptionally brilliant performance is to be assigned an 'A+' grade. Even the best student of any class needs to be good enough to be awarded the 'A+' grade. In addition, there shall be two transitional symbols used by Examiners.

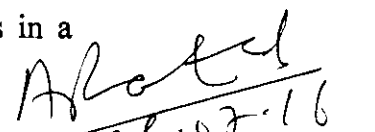
I - for Incomplete

X - for Debarred.

- (ii) The student's performance in any semester will be assessed by the *Semester Grade Point Average (SGPA)*. Similarly, his performance at the end of two or more consecutive semesters will be denoted by the *Cumulative Grade Point Average (CGPA)*. The *SGPA* and *CGPA* are calculated as follows:

$$SGPA = \frac{\sum_{i=1}^n c_i g_i}{\sum_{i=1}^n c_i}$$

where c_i is the number of credits of course i
 g_i is the Grade Point for the course i
 and n is the number of courses in a semester

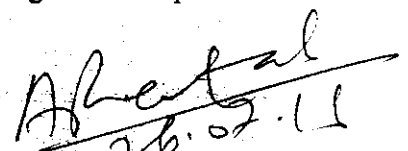

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$$CGPA = \frac{\sum_{i=1}^n c_i g_i}{\sum_{i=1}^n c_i}$$

where c_i is the number of credits of course i
 g_i is the Grade Point for the course i and n is the number of courses of all semesters up to which $CGPA$ is computed.

- (iii) No student will be allowed to move further if $CGPA$ is less than 3 at the end of every academic year. Whenever these Grade Point Averages are to be used for the purpose of determining the inter-se-merit ranking of a group of students, only the rounded off values will be taken into account.
- (iv) When a student gets grade 'I' for any subject(s) during a semester, the $SGPA$ for that semester and the $CGPA$ will be tentatively calculated ignoring this subject. After the 'I' grade(s) has been replaced by an appropriate grade(s), the $SGPA$ for that semester and the $CGPA$ will finally be recalculated taking into account the performance in the subject(s) concerned. Further, a debarred grade "X" will be awarded if a student who:
- is absent for a major part of a semester, or
 - does not complete a major part of the laboratory/design/ workshop/seminar work *etc.* or
 - does not appear in the mid-semester examination without any acceptable ground, shall be awarded grade 'X' and he/she shall be debarred from appearing at the end semester examination of the corresponding subject(s). or
- A student who is debarred from appearing at an end-semester examination for reasons as specified by clause – (iv) will be required to re-register for the subject(s) in the next semester when they are offered by the Centre, subject to other conditions of the regulations.
- (v) When a student gets grade 'F' for any subject(s) during a semester, the $SGPA$ and $CGPA$ from that semester onwards will be tentatively calculated, taking only 'zero points' for each such 'F' grade. After the F grade(s) has been substituted by a higher grade in the supplementary examination or in a subsequent semester, the $SGPA$ and $CGPA$ of all the semesters, onwards from the semester in which 'F' grade was obtained earlier, will be suitably modified to take this change of grade into account.
- (vi) In the case of a relatively large class and/or classes where the performance level depicts more or less a normal distribution:
- The average performance (around mean value of marks) is to be assigned 'C' grade. However, if by teacher's/co-ordination committee's perception the general level of the class is considered to be appreciably high, the average performance may be assigned 'B' grade.
 - All other marks to grade conversion are to be done relatively with respect to the average performance in between (but excluding) the 'F' and 'A+' grades, which have already been assigned, by choosing appropriate boundary marks between grades.
 - Normally, in a reasonably large class of students distribution of grades is expected to be as follows:

A+	≤ 10 %
A	10 - 20 %
B, C, D	20 - 35 %


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P	10 - 25 %
F	≤ 5 %

(d) In the case where a student appears in the supplementary examination the conversion from marks to grade would be done applying the same norm as was framed for the original class.

3.6 Transcript

The transcript issued to the student at the time of leaving the University will contain a consolidated record of all the courses taken, credits earned, grades obtained, SGPA, CGPA, etc.

3.7 Residency Requirement

Every research scholar has to have a minimum residency period of one academic year in the University including the time spent on coursework. For part-time students, minimum residency period should be six months to complete the course work and rest in contact with supervisor.

3.8 Changes in Thesis Advisor and/or Doctoral Committee

A doctoral student will have the option to request changes to his/her Thesis Advisor/CoAdvisor and/or Doctoral Committee (Appendix-III) under special circumstances. If the request is due to changes in his/her research topic/areas, it is the responsibility of the (new) Doctoral Committee to ensure that the research scholar acquires enough knowledge to proceed with the research programme. Such changes are to be approved by the Dean, PGPR.

3.9 Independent Research

A Doctoral Student is expected to carry out independent research work under his/her Thesis Advisor.

3.10 Thesis Proposal and Advancement to Candidacy

Within one year after the successful completion of the Course work, the Doctoral Student is required to present his/her thesis proposal to the Doctoral Committee for approval.

3.11 Seminar

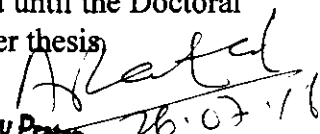
After advancement to candidacy, all research scholars are required to present two seminars (open to public) on their research. This will help in getting the feedback and comments on the research work which may be suitably incorporated in the thesis. The seminar notice will be displayed on the Centre's notice board at least a week in advance and a copy sent to the Dean, PGPR.

3.12 Publication

Every research scholar is expected to have at least two research papers in the area of doctoral research accepted for publication in SCI Journals. It is necessary that the affiliation is clearly mentioned as "Aryabhatta Centre for Nanoscience and Nanotechnology, Aryabhatta Knowledge University, Patna 800001, India".

3.13 Thesis Synopsis and Pre-Defense

Once the Thesis Advisor is satisfied that the caliber and quantum of the research work carried out by his/her research scholar is sufficient for the award of the Ph.D. degree by the University, the research scholar is required to submit a synopsis as well as present a seminar to the Doctoral Committee. The synopsis and the seminar presentation may both be repeated until the Doctoral Committee is satisfied that the research scholar is ready to start writing his/her thesis


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