

BIRLA INSTITUTE OF TECHNOLOGY

MESRA, RANCHI - 835213

Ph.D. REGULATION – 2015

1. PREAMBLE

- 1.1. Consistent with the availability of the required infrastructure, the Birla Institute of Technology, Mesra, Ranchi, a deemed university u/s 3 of UGC act, 1956, hereinafter referred to as the Institute, shall provide facilities for research in several areas of Science, Technology, Engineering, Architecture, Pharmacy, Management, Humanities and other interdisciplinary fields leading to the award of the Degree of Doctor of Philosophy, hereinafter abbreviated as Ph.D. Extension Campus, wherever mentioned in these regulations, refers to an Extension Campus of the Institute. International Campus, wherever mentioned in these regulations, refers to an International Campus of the Institute.
- 1.2. The Regulations, hereinafter specified, lay down the procedure to be adopted for the research Programme for the Ph.D. Degree of the Institute.
- 1.3. Department, wherever mentioned in these Regulations refers to a Department of the Institute.
- 1.4. Academic Council, wherever mentioned in these regulations, refers to the Academic Council of the Institute.
- 1.5. Departmental Academic Committee, wherever mentioned in these regulations, refers to the Departmental Academic Committee of the Department.
- 1.6. Academic Committee, wherever mentioned in these regulations, refers to the Centre's Academic Committee of the Extension Campus / International Campus.
- 1.7. A scholar is an eligible person, who is enrolled at the Institute for any specific Ph.D. Programme. Prior to enrollment, this person is referred to as an applicant.
- 1.8. Guide/Co-guide/Internal Guide/External Guide is a person approved by the Academic Council for the guidance of the Scholar while pursuing the programme of research leading to Ph.D. degree of the Institute.

2. OBJECTIVES OF THE PH.D. PROGRAMME

- 2.1 The objectives of this programme are to impart research training to the scholar, and prepare him/her for a career in independent investigation and original research so as to enable him to make a significant contribution to knowledge in his/her field and profession. The training programme shall ensure that it is not an end in itself, but a means for a fruitful research career.
- 2.2 To achieve these objectives, the training programme shall ensure the following:
 - (a) Acquisition of fundamental knowledge in the chosen discipline.
 - (b) Acquisition of in-depth knowledge in the field of research.
 - (c) Training in the use of research tools of the field, and develop skill and capability to conduct original research.

3. ELIGIBILITY CRITERIA FOR SELECTION

3.1. Candidates with following qualifications shall be eligible for admission to the Ph. D. Programme of the Institute:

- (a) Candidates possessing M. Tech / M. E / M. Sc. (Engg.) / M. Arch / M.Pharm / M.Sc. / MCA / MBA or equivalent Degree in relevant branch from a recognized University / Institute with minimum 60% marks or 6.0 CGPA on a ten point scale in the qualifying examination are eligible to apply for admission in the departments as per their Specialization.
- (b) Candidates possessing B. Tech/ B. E/ B. Sc. (Engg.)/ B.Pharm/ B. Arch or equivalent Degree in relevant branch from a recognized University/ Institute with minimum 70% or 7.0 CGPA on a ten point scale in the qualifying examination and a valid GATE score with a minimum of 80 percentile are eligible to apply for admission in the departments as per their Specialization.
- (c) Candidates possessing B. Tech/ B. E/ B. Sc. (Engg.)/ B.Pharm/ B. Arch or equivalent Degree in relevant branch from a recognized University/ Institute with minimum 70% or 7.0 CGPA on a ten point scale in the qualifying examination and employed in R&D organisations and having ten years experience with good research credentials are eligible to apply for admission in the departments as per their Specialization.

Note: In case of the candidates with other grade point scale, the decision of the equivalence committee of the Institute shall be final.

3.2 RELAXATION FOR SC/ ST CANDIDATES

Eligibility criteria will be relaxed by 5% marks for SC/ ST candidates.

4. SELECTION PROCEDURE

Pre Admission Procedure

- 4.1. The Ph.D. Programme shall be open to candidates of any Nationality in true spirit of a University Education provided that the candidate satisfies the clause 3.
- 4.2. The admission into the Ph.D. Programme shall be made twice a year only, in January / July each year through All India Admission Test. Any applicant seeking admission to the Ph.D. Programme shall in the first instance submit an application in the prescribed Application Form to the Dean (Admission & Academic Coordination) as per the Institute notification through advertisement in the News Papers/ Notification on the Institute Website www.bitmesra.ac.in. The prescribed Application Form may be obtained from the Institute website.
- 4.3. The research areas of each of the department offering Ph. D. programme will be displayed on the Institute website.
- 4.4. Selection to the Ph.D. Programmes would be based on previous Academic record, Performance in an entrance test followed by an Interview. The syllabi of the Entrance Tests for each Department will be displayed on the Institute website.

4.5 Provisional selection lists, along with procedures for admissions, will be notified after the interview, on the Institute website and Notice Boards of the Institute only. Provisionally selected applicants will be required to take admission by the date specified; failing which vacant seats may be allotted to waitlisted applicants. The list of waitlisted applicants will also be announced on our website and Institute Notice Boards only. **No separate intimation will be sent to applicants.**

5. ENROLMENT

5.1 After submission of the required fees, the applicant will be assigned the Institute Roll Number by the Admission Office. Applicants provisionally admitted to the Ph.D. Programme will be required to contact the Head of the concerned department to get acquainted with research facilities & faculty members of the Department. The department will call the meeting of the Departmental Academic committee (DAC) to finalise the field of interest of the candidate, Guide / Co-guide for the candidate and course work required for his enrolment to the Ph.D. Programme. The candidate is then required to fill up the enrolment form (**Annexure – II**) and deposit the same to the semester office / Dean (PG&R) office within the specified date.

6. GUIDE FOR THE SCHOLAR

6.1 There shall normally be a Guide for each scholar embarking on a programme of research for Ph.D. Degree, approved by the Academic Council. He / She shall normally be:

- (a) A Full-time faculty member of the Institute or Extension Campus holding Ph.D. Degree.
- (b) A Professor of the Institute holding at least a Master's degree, with considerable amount of proven research experience in the field.

For greater participation of the faculty in the research programme and to build wider R & D base in the Institute, the Academic Council normally may restrict the number of Ph.D. scholars at a time under a Guide to five for an Assistant Professor and eight for an Associate Professor/Professor.

6.2 The following categories of persons are permitted to be associated with the Ph.D. Programme only as a Co-guide but not as a Guide.

- (i) Faculty members nearing superannuation with not more than 3 years of service left at the Institute.
- (ii) Faculty members on contract for not more than 3 years.

6.3 If considered necessary, the Academic Council may approve another Guide who could be a teacher of the Institute or an external expert of the domain with proper justifications for joint supervision and guidance of the scholar. In such a case, teacher/expert so appointed, shall be designated as Co-guide / external Guide as may be the case.

6.4 Also, in the event, the Academic Council permits an applicant from another Institution/Organization to be admitted to the Ph.D. Programme at the Institute, the Academic Council may approve joint supervision of scholar's work by a suitably qualified external Guide after examining his/her bio-data. The application of such an external candidate must be forwarded by a competent authority of applicant's Institution/Organization.

6.5 **Appointment of Guide(s)**

6.5.1 The Department Academic Committee (DAC) will appoint Guide(s) of Ph.D. students.

6.5.2 The Guide(s) should be identified and appointed at the earliest and within six months from the date of admission.

6.6 Notwithstanding the provisions contained in the above Clauses, a teacher of this Institute who has considerable experience in his/her chosen field of research, may be permitted by the Academic Council to pursue his/her Ph.D. Programme on his/her own without a Guide, provided that the Admission Committee has recommended such a course of action. In all cases, Chairman of the Doctoral Committee will perform all the duties of the Guide except the detailed supervision of the Thesis.

7. **FUNCTION OF THE GUIDE(S)**

7.1 The functions of the Guide shall be as under:

- (a) Assessment of the suitability and aptitude of the applicant for the proposed research work and reporting on the same to the appropriate **Departmental Academic Committee**, and the facilities required for the same.
- (b) Critical evaluation of the proposed research work of the applicant with a view to ensure that it would be a piece of original work, and when completed, it would positively contribute to the knowledge in the field.
- (c) Guidance and supervision of the work of the scholars after the approval and registration by the Academic Council.

7.2 The External Guide/Co-guide (if any) shall undertake joint supervision/guidance of the work of the scholar under mutual consultations with the internal Guide/Guide.

8. **RESIDENCE REQUIREMENT FOR EXTERNAL SCHOLAR AT THIS INSTITUTE / EXTENSION CAMPUS**

The residential requirement is essential to build the research atmosphere in the Institute. The residential requirement for external Ph.D. candidate shall be a minimum period of one semester at the Institute/Extension Campus.

9. DEPARTMENTAL ACADEMIC COMMITTEE (DAC)

9.1 Each Department shall have a Departmental Academic Committee (DAC) duly approved by the Academic Council with the following composition:

A. Department of the Institute:

- (a) Head of the Department : Chairman
- (b) All Professors : Members
- (c) Other five Faculty Members of the Department with Ph. D. Degree : Member
(on 2 years rotation basis and to be nominated by the concerned Head)
- (c) Two Faculty Members from allied Department : Members
- (d) The Guide(s) of the candidate : Member(s)

B. Extension Campus/International Campus:

- (a) Director/Coordinator of the Campus : Chairman
(Provided, he/ she posses the qualification as per Clause 6.1 of the Regulations. If not, then Dean(PG&R) in consultation with VC shall nominate a faculty member of the level of Professor /Associate Professor qualifying the Clause 6.1 as the Chairperson Academic Committee by rotation of two years and the Director / The Coordinator of the Campus will be a special invitee in all meetings).
- (b) All Professors and two faculty members of the Campus : Members
(with Ph.D. Degree on the two years rotation basis to be nominated by the Heads /Academic Section Incharges).
- (c) Two Teachers of the Department/same Department of the Main Campus : Member
(One related to the domain of research and another related to discipline of research)
- (d) Two faculty members of the allied Department nominated by the : Member
Vice-Chancellor.
- (e) One eminent person with Ph.D. : Member
(from Industry/R&D Organization/other Institution of related field by rotation of two years).
- (f) The Guide(s) of the candidate (in case of Ph.D. Admission) : Member

9.2 Action by the Departmental Academic Committee (DAC)

9.2.1 The scholar immediately after admission, will report to the respective Department. The Chairman DAC shall brief him/her about the facilities and faculties of the Department. The candidate is required to interact with faculty members of the Department. The scholar shall intimate the chairman DAC the proposed field of research and Guide(s) within the stipulated time period.

9.2.2 The Departmental Academic Committee shall call the candidate for counseling on a date and time convenient to the members of the committee to discuss his/her Research programme/selection of Guide(s) and assignment of course work before filling the enrollment

form. If necessary the DAC may consult the proposed Guide(s) for his/her consent. The recommendation for the course work must be submitted within the specified time in the academic calendar to the Dean (PG&R) for the approval.

9.2.3 In cases where the Guide has supervised the scholar for two years or more, the following shall be taken into consideration.

- (a) If the sole Guide proceeds on leave for more than six months, it will be his/her responsibility to suggest a suitable internal Guide to all scholars registered under him/her in consultation of the concerned scholar. The Doctoral Committee, on receiving a formal request from the scholar, duly endorsed by Guide, should forward the name of Internal Guide/Co-Guide to Academic Council through Dean (PG&R) for consideration. In all such cases, the written consent of Internal Guide is mandatory. However, if the leave is more than one month but less than six months, the Chairman Doctoral Committee or his nominee shall look after the responsibility of the Guide during the absence of the Guide, on receiving a formal request from the Scholar/Guide.
- (b) A faculty superannuating will continue to be the sole Guide if the thesis is submitted within six months after superannuation. However, if the thesis is not ready for submission within six months, a Co-guide must be recommended by the Doctoral Committee, on receiving a formal request from the Scholar/Guide.
- (c) A Guide resigning from the Institute service will cease to be the Sole Guide of the Scholar. Such Guide in consultation with his/her scholar (s) shall suggest an Internal Guide for each scholar to the chairman of concerned Doctoral Committee for approval by the Academic Council. Such Guide may continue as an External Guide provided he/she has Guided the scholar at least two years from date of scholar's registration in Ph.D. Programme. However, if the Guide does not comply the same, he/she ceases to be the External Guide as well.

9.2.4 In case, where guidance has been given for less than two years, the following shall be taken into consideration.

- (a) When a person proceeds on leave for more than six months but not more than one year, a joint Guide be appointed by the Doctoral Committee. However if the leave is more than one year the person shall cease to be a Guide.

9.2.5 In case of superannuation or demise of Guide/external Guide the following will be taken in to consideration.

- (a) A person superannuating from the Institute services will continue as the Guide if thesis is submitted within the six months. However, if the submission of thesis needs more than six month and the person has Guided the scholar for more than two years, he may be considered as external Guide.
- (b) A person joining the Institute as an professor Emeritus/Scientist or in any other capacity after superannuation from the service of this Institute, he may continue to be sole Guide or as joint Guide or Co-guide for the scholar already registered under him/her till the end of his/her re-employment period.
- (c) In case of demise of the Guide/External Guide of Ph.D. scholar, the Doctoral Committee shall recommend a suitable Guide on receiving a formal request from the scholar to the Academic Council for approval.

9.2.6 Any Faculty who has less than or equal to three years of service left from the end of the academic session in the month of June/December of the year he/she superannuates cannot be appointed a sole Guide.

9.2.7 Persons from outside the Institute (joining as Emeritus Scientists or Chair Professor) having more than two years of service left, can be appointed as joint Guide for new scholars.

Note: The above points are Guidelines. The recommendation of the DAC and Doctoral Committee of a scholar shall be given due consideration in making a decision in a particular case.

9.2.8 The scholar/Guide(s) should intimate the Institute regarding any change of his/her employment status, if any.

10. COURSE WORK:

10.1 A scholar immediately after provisional admission in the Ph.D. Programme has to undertake course work as prescribed by the Departmental Academic Committee/Academic Committee of the scholar. The following will be taken into consideration while assigning the course work.

(A) All Ph.D. Scholars who have passed the M.E./M.Tech./M.Pharm/M.Arch/M.Planning
Semester – 1:

Type of Course Credit

i) Theory Courses:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Research Methodology | 3.0 |
| 2. | Two Theory Courses (Related to the discipline of research) | 6.0 |

ii) Term Papers:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Term Paper -1 <i>Literature Review (in the domain of research)</i> | 3.0 |

Total Credit - 12

(B) All Ph.D. Scholars who have passed MBA/ M.Sc./MCA or equivalent qualification will be required to complete the following courses in one semester

Semester – 1:

Type of Course Credit

i) Theory Courses:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Research Methodology | 3.0 |
| 2. | Three Theory Courses (Related to the discipline of research) | 9.0 |

ii) Term Papers:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Term Paper -1 <i>Literature Review (in the domain of research)</i> | 3.0 |

Total Credit - 15

(C) All Ph.D. Scholars with B.E/B.Tech./B.Pharm/B.Arch/M.B.B.S. will be required to complete the following courses in one year (two semesters) after registration to the Ph.D. Programme.

Semester – 1:

Type of Course Credit

i) Theory courses:

| Sl.No. | Course | Credit |
|--------|--|--------|
| 1. | Research Methodology | 3.0 |
| 2. | Three Theory Courses <i>(Related to the discipline of research)</i> | 9.0 |

ii) Term Papers:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Term Paper -1 <i>Literature Review (in the domain of research)</i> | 3.0 |

Total Credit - 15

Semester – 2:

Type of Course Credit

i) Theory courses:

| Sl.No. | Course | Credit |
|--------|---|--------|
| 1. | Four Theory Courses <i>(Related to the discipline of research)</i> | 12.0 |

ii) Term Papers:

| Sl.No. | Course | Credit |
|--------|--|--------|
| 1. | Term Paper -II Any topic related to research/lab work | 3.0 |

Total Credit - 15

Total Credit 15+15=30 Credits

10.2 The maximum duration for completion of the course programmes will be one year for categories 10.1(A) & (B) and two years for category 10.1(C) after that enrolment will be withdrawn.

10.3 The theory courses shall be offered through class room instructions / **directed studies**.

10.4. The above course work is the minimum requirement for submission of the Ph.D. thesis for evaluation. However, the Doctoral Committee may assign additional *credit/non-credit* course work to the scholar if it feels necessary for the Ph.D. Programme of the scholar.

Note : The scholar shall present a Seminar and submit two copies of each Term Paper to the Doctoral Committee for Evaluation. The Doctoral Committee will submit the evaluation marks to the examination office for processing the result. A scholar of the Ph.D. Programme may be advised

to take appropriate/ audit courses at the postgraduate levels at the Institute to make up for his/her deficiencies or as a help in preparation for the written qualifying courses.

11. EXAMINATION AND ASSESSMENT

- 11.1 Each theory course shall be evaluated for a maximum of 100 marks though progressive internal assessment in the form of Quiz, Assignment and End-Semester examinations. The weightage of Quiz & Assignment and End-Semester marks shall be 30%, 10% and 60% respectively.
- 11.2 There shall be 3 written Quiz at specified intervals; each shall be of 40 - 50 minutes duration. The progressive internal assessment shall be based on best two out of three Quiz. The End-Semester questions in theory papers shall have enough choice for the candidates. The duration of examination for the theory courses shall be three hours and shall carry 60 marks. The procedure and assessment of assignment is given in **Annexure – IX**
- 11.3 Each term paper will be evaluated for 100 marks out of which 60% marks will be allocated for Progressive internal assessment during the conduct of course and the remaining 40% will be allotted for End-Semester Examination.
- 11.4 If a student does not appear in end Semester in Theory / Term paper, he / she will be given maximum of grade 'C'.
- 11.5 On satisfactory completion of the prescribed component of the course, students will normally proceed to registration for Ph.D. thesis.

11.6 AWARDING GRADES

- 11.6.1 Based on the result of the examination, the performance of the students shall be graded on the 10-point scale as under:

| Grade | Grade Point | Percentage of Marks obtained |
|--------------|--------------------|-------------------------------------|
| Ex | 10 | 90% and above |
| A+ | 09 | 80% to 89% |
| A | 08 | 70% to 79% |
| B+ | 07 | 60% to 69% |
| B | 06 | 50% to 59% |
| C | 05 | 40% to 49% |
| D | 04 | 20% to 39% |
| F | 00 | Less than 20% |

12. ACADEMIC CREDIT

- 12.1 To earn academic credit in a subject, a student should get a grading of 'B+' or above.

13. REGISTRATION

- 13.1 Registration for the Ph. D. Programme shall be allowed only after successful completion of the course work
- 13.2 Seminar for the registration should normally be held within **one calendar year of enrolment of a student.**

- 13.3 Seminar presentation will be delivered to an open audience and in the presence of the members of Departmental Academic Committee and Doctoral Committee. If the seminar is satisfactory then candidate will be allowed to register for the Ph. D. Programme. However, **if the Departmental Academic Committee and Doctoral Committee are not satisfied** by the seminar presentation, the candidate will be **required to deliver another presentation** with suitable **modification or improvement within next three months**.
- 13.4 If a candidate fails **to clear the registration seminar even on second attempt the enrolment shall be cancelled** and the student shall be asked to leave the programme. The Ph.D. registration is valid for a period of six years from the date of registration, however if a candidate fails to submit thesis within six years and DC feels appreciable progress in the work, then it may be extended to a maximum period of two years. Thereafter no further extension shall be allowed, and candidate's registration shall stand cancelled automatically.
- 13.5 *In the event of a candidate failing to submit his thesis within the maximum period allowed for completing research work, then DC may recommend for extension of registration (Based on progress of the research work) by one/ two year(s) to the vice chancellor through Dean (PG & Research).*

14. DOCTORAL COMMITTEE (DC)

- 14.1. The Doctoral Committee for a scholar in any Department of the Institute shall consist of normally six members as given below:

- | | | |
|-----|---|-------------------------|
| (a) | The Head of the concerned Department | : Chairman (Ex-officio) |
| (b) | The Guide(s) | : Member |
| (c) | Two teachers of the Department (One related to the domain of research and another related to discipline of research) | : Member |
| (d) | Two experts from the Allied Departments related to the domain of research | : Member |

- 14.2 For Extension Campus/International Campus, the Doctoral Committee shall consist of the following members:

- | | | |
|-----|--|-------------------------|
| (a) | Director/Incharge | : Chairman (Ex-officio) |
| (b) | Guide(s) - Member | : Member |
| (c) | Two Teachers of the Department/same Department of the Main Campus (One related to the domain of research and another related to discipline of research) | : Member |
| (d) | Two faculty members of the allied Department nominated by the Vice-Chancellor | : Member |

14.3 Function of the Doctoral Committee

After the registration of the scholar for the programme, the Doctoral Committee shall perform the following functions:

- (a) Shall make at least one progressive review of the scholar in every semester in association with the Guide / Guide and Co-guide / internal & external Guides, if any, as may be feasible.
- (b) Shall forward progress report to the Vice-Chancellor, through Dean (PG & R) on the progress of scholar's research programme in the specified format.
- (c) Suggest suitable remedial action to the appropriate authority if the scholar's progress is not satisfactory for any reason.
- (d) Shall organize a Pre-Ph.D. submission Seminar after the completion of the research work of the scholar where the candidate should submit the complete text of his/her thesis in **typed and unbound form** and present the seminar. The Doctoral Committee shall submit its recommendation on the seminar in the specified format through the Dean (PG & R), to the Vice Chancellor.
- (e) When scholar submits his/her thesis, the Doctoral Committee, after due verification of the compliance requirements, shall recommend names of five Indian & five Foreign Examiners working in the relevant field for the evaluation of the Thesis. These names shall be in the form of a panel, and this shall be submitted to the Vice – Chancellor through Dean (PG & R) for approval.
- (f) On receipt of the observations/recommendations of the examiners of the thesis, shall submit these with the Committee's recommendations to the Vice-Chancellor through the Dean (PG & R) for further necessary action. In the event, the reports of the examiners are favourable to the scholar as provided, then the Doctoral Committee would also recommend names for the Viva-voce Board of the Scholar.

15. TRANSFER FROM FULL-TIME TO PART-TIME SCHOLAR AND VICE - VERSA:

A Full-Time category research scholar may be considered for Part-Time category research scholar on request provided he/she fulfils the following conditions:

- (i) Residential requirement has been completed.
- (ii) The prescribed course work has been successfully completed.
- (iii) No objection certificate from the employer has been submitted.
- (iv) In all such cases, the fellowship awarded to him/her will be withdrawn.
- (v) Fee and other terms and conditions will be applicable as per rules and regulations of the Institute.

The Institute may also permit a Part-Time research scholar to switch over to Full-Time scholar provided his/her Guide has vacant seat to accommodate him/her.

16. COMPLIANCE REPORT:

Prior to the submission of the thesis, the scholar registered for the Ph.D. Programme either at the Institute or its Extension Campus should have complied with the following requirements:

- (a) He/she must have carried out the research work for a minimum period, counted from the date on which the admission fee has been deposited, as specified below, after his/her registration for Ph.D. Programme.
 - (i) Master's degree holder – Two years
 - (ii) Bachelor's degree holder or equivalent – Three years
 - (iii) Teacher of the Institute permitted to work independently for Ph.D. degree – Two Years
- (b) He/She should have satisfied the minimum residence requirement.
- (c) He/She should have taken and passed the prescribed qualifying examination and course works.
- (d) He/She must have published at least one research paper in a referred journal of repute.
- (e) He/She must have made Pre-Ph.D. thesis submission seminar presentation of his/her thesis work in the concerned Department of the Institute at the main campus. However, for International Campus, the Doctoral Committee shall decide the venue of presentation.

17. ORGANIZATION OF THE THESIS:

- 17.1 The thesis shall be a factual record of the scholar's research work characterized by discovery of facts, or fresh interpretation of facts and theories, or an independent design or development of new product. It should bear evidence of the scholar's judgment and ability to carry out independent investigation, design or development work.
- 17.2 The thesis must contain besides the text and common matters like References and Conclusions:
 - (i) An Introduction in which the scholar shall state whether the thesis is based on discovery of new facts or new interpretation of established facts by others, or based on exhaustive study and critical analysis of published work of others, or design, or development work undertaken.
 - (ii) The scholar shall further furnish a statement indicating the sources from which the information has been derived, and the extent to which he/she has based his/her work on the work of others, and shall indicate which portion of the thesis is claimed as original. The scholar shall furnish a declaration in the thesis as given in Annexure VI.
 - (iii) An Abstract of the thesis (about 500 words) with key words (about 10);
 - (iv) References

References in the thesis should be as per standard of International Journals (e.g. Springer, Elsevier, etc. journals) but they must be uniform throughout the thesis.

- (v) A Certificate (in standard format, Annexure VII) from the Guide(s) that (a) the work has been carried under his/her/their supervision, (b) the candidate has fulfilled all prescribed requirements and (c) the thesis which is based on candidate's own work has not been submitted elsewhere for a Degree/Diploma.
- (vi) The cover page of the thesis shall be sky – blue in colour and in the standard format as given in Annexure VIII.
- (vii) The text in the thesis shall be **Times New Roman font size 12**. All Figures and Tables shall have appropriate legend.

17.3 The Thesis submitted for the Ph.D. degree shall not be one for which a degree or diploma had already been awarded other than that submitted for the course works in the Ph.D. Programme at the Institute.

17.4 Nothing contained in these regulations, shall preclude a scholar from publishing either independently or jointly with his/her supervisor(s), the results of the work incorporated in the thesis, at any time before the submission of the thesis.

18. ADJUDICATION OF THESIS:

18.1 The Chairman of the Doctoral Committee will send the list of Examiners (five Indians & five Foreigners) alongwith synopsis of the Ph.D. thesis immediately after the pre-submission seminar of the students to the Vice-Chancellor through Dean (PG&R).

18.2 The candidate has to submit 3 copies of thesis (soft bound) and one soft copy of the same for evaluation purpose. After evaluation and before viva-voce, the candidate should submit 3 copies (hard bound) and one soft copy one each for examination, library and UGC respectively after incorporating corrections recommended by the examiners, (if any).

18.2 The Evaluation of the thesis submitted by a scholar for the Ph.D. degree shall be carried out by a Board of Examiners appointed for the purpose by the Academic Council. The Doctoral Committee shall submit a panel of examiners for this Board. The Board of Examiners shall normally consist of the following experts:

- (a) Two external experts, one from within the country and the other from outside the country.

18.3 Correspondence with the Examiners will be undertaken only by the Vice- Chancellor or by any other officer of the Institute specifically delegated with the power. Each examiner shall be required to examine the thesis independently and forward his/her report with his/her recommendations directly addressed to the Vice-Chancellor. All the reports, so received shall be considered by the Doctoral Committee which will then forward these reports with its own observations/recommendations to the Vice-Chancellor through the Dean (PG & R).

18.5. If all these reports are unanimously favourable to the scholar, the Doctoral Committee will also submit to the Vice-Chancellor through Dean (PG & R), its recommendations for the constitution of the Viva-voce Board for the scholar. The Viva voce board shall be approved by the Academic Council.

- 18.6 If there is no unanimity in the recommendation of the Board of Examiners, and if the majority of them do not recommend outright rejection of the thesis, the Academic Council may permit resubmission of the thesis after revision within two years from the date of the Academic Council's decision. The revised thesis will then be sent to the same set of examiners for their opinion. If, however, any of the previous examiners decline to examine the resubmitted thesis the same will then be sent to another examiner of the same category.
- 18.7 Also, if there is no unanimity in the recommendation of the examiners of the Board but the majority of them have submitted recommendations favourable to the Scholar, the Vice-Chancellor may send the thesis along with the observations of the examiners (but without disclosing the name of the examiners) to an eminent person in the field, for his opinion on the thesis. His opinion shall be final and binding.
- 18.8 For unanimous/majority rejection of the thesis, the scholar shall be dropped automatically from the Ph.D. Programme.

19. VIVA-VOCE BOARD AND AWARD OF THE Ph.D. DEGREE

- 19.1 In the event, the Academic Council is satisfied with the recommendations of the Board of Examiners setup for adjudication of the thesis, the Academic Council will appoint a Viva - voce Board as per the recommendations of the Doctoral Committee, composed as under:
- (a) Chairman (Doctoral Committee): Chairman (Ex-Officio)
 - (b) Indian thesis examiner: Member
 - (c) All members of the Doctoral Committee: Members
 - (e) Dean (PG & R): Observer
- 19.2 The Viva-voce Board shall conduct an oral examination of the scholar normally in the Institute with a view to test the scholar's insight and power of comprehension in his/her field of research , and his/her understanding of the allied fields. The Viva-voce Board shall submit its report(s) / recommendation(s) to the Vice Chancellor. The Vice Chancellor, in turn, will submit the document to the Academic Council which may recommend the award of the Ph.D. degree to the scholar if the recommendations are favourable to the scholar. If, for any reason, the recommendations of the Viva-voce Board are not favourable to the scholar, he/she will be permitted to appear before the Viva-voce Board again, within a period of one year from the date of the previous meeting of the Board.
- 19.3 In the case of a teacher permitted to work independently without any Guide for his/her Ph.D. degree, the Board of Examiners and the Viva-voce Board shall include a senior teacher of the Institute in the field of specialization or allied field or an outside expert appointed by the Academic Council on the recommendations of the Doctoral Committee.
- 19.4 The **basic discipline** of the scholar (Science/ Technology/ Engineering/ Architecture/ Pharmacy/Medical Sciences/Management/Humanities or any other discipline approved by the Academic Council) and his/her **domain of research** will jointly determine the discipline in which the Ph.D. degree will be awarded.

20. LEAVE RULES

- 20.1 All Research Scholars are entitled for leave for a maximum of **thirty days per year** in addition to Institute Holidays. Also **10 days leave** on medical reasons is permitted.
- 20.2 In addition to the above mentioned in 20.1, women scholars are also entitled for **maternity leave** for a period of not exceeding 180 days, once during the tenure of their studentship. This should be supported by a medical certificate.
- 20.3 No vacation in Summer/Winter is admissible.
- 20.4 Special Leave to attend Seminars/Conferences in India/abroad to present research papers, with the permission of the **Dean (PG&R) is admissible**.
- 20.5 Research Scholars under funded projects will be governed by the rules of the funding agencies.

Annexure - I

BIRLA INSTITUTE OF TECHNOLOGY Mesra, Ranchi - 835215

Grouping* of candidates who can apply for the Ph.D programme

| Sl. No. | Nature of candidates | Full-time/ Part-time | Remarks | Selection procedures |
|---------|--|-------------------------|---|--|
| A | CSIR-NET/BRNS/NBHM qualified candidates etc. | Full-time | Fellowship as per norms from agency | As given in web notification through Test & Interviews, etc. |
| B | Institute fellowship | Full-time | Fellowship from Institute | -----do----- |
| C | Without fellowship | Full-time | Self financed | -----do----- |
| D | Already working in project as JRF/RA in any Department or Appointed later in project as JRF/RA in any Department | Full-time Part-time | Fellowship as per norms from assigned project | -----do----- |
| E | Faculty/Staff of other Institutes/Labs (QIP)/Govt. Departments/Industry, etc. | Full-time | Sponsored | -----do----- |
| F | Faculty/Staff of other Institutes/Labs/Govt. Departments/Industry, etc. | Part-time | Sponsored/Self financed | -----do----- |
| G | Faculty/Staff of Institute + BIT Extension Campuss + BIT International Campuss | Part-time | Sponsored | -----do----- |
| H | a) NRI candidates b) Foreign Nationals** | Full-time Part-time | Sponsored/Self financed ** | -----do----- |

* This tentative grouping is merely intended to provide guideline to candidates for filling the Form. For any queries please consult the Head of Department/Dean Doctoral Research (Contact details on website)

ANNEXURE – II

ENROLLMENT FORM FOR PH.D. PROGRAMME

Date: _____

The Vice Chancellor
Birla Institute of Technology
Mesra, Ranchi – 835215

Through: The Dean, PG and Research

Dear Sir,

1. I have been admitted to the Ph.D. Programme of the Institute in Department of _____.
I am enclosing herewith my bio-data at **Annexure-1** for your kind perusal and needful.
2. My proposed field of research will be
 - a) Discipline: _____
 - b) Field of Research work: _____
 - c) Name of the Guide (Optional): _____
 - d) Proposed Course work: _____

| Theory | | Term Paper | |
|--------|---------|------------|---------|
| Code | Subject | Code | Subject |
| | | | |
| | | | |
| | | | |

3. The forwarding letter of my organization (for external candidate only) is attached at **Annexure-2(a)**. The No Objection Certificate of my external guide’s organization/Institution to supervise my work is attached at **Annexure - 2(b)**. The certificate for providing the required research facilities by my organization/institution is attached at **Annexure-2(c)**.
4. I certify that the particulars given above are correct and I undertake to
 - a) Abide by the Rules of the Institute during the Ph.D. Programme.
 - b) Appear before the relevant Admission Committee whenever directed to do so.
 - c) Take any test or qualifying examinations as specified for the Ph.D. programme, and
 - d) Withdraw myself from the Ph.D. programme of the Institute, if asked to do so (under clause 48 of Ph.D. regulation).
5. The proof of my date of birth, caste (General/OBC/BC/SC/ST) and qualifications are attached at **Annexure-3**.
6. I shall also comply with residential requirement specified for the Ph.D. programme.

Thanking you
Yours faithfully

Signature: _____

Name: _____

Roll No. _____

Approved / Recommended / Comments _____

Chairman (DAC) / Head of the Department _____

ANNEXURE - III
MINUTES OF THE DEPARTMENTAL ACADEMIC COMMITTEE (DAC) /
CENTRE ACADEMIC COMMITTEE (CAC) FOR EXTENSION CAMPUS

MEETING

1. **Date of DAC Meeting**
2. **Name of the Department:**
3. **Name of the candidate and Roll No.**
4. **Affiliation :**
5. **Contact Address:**
Telephone / Mobile No./Email Id :
6. **Permanent Address :**
7. **Qualification of the candidate** (Degree with specialization, Year of passing, % marks and University)
8. **Details of Guides** (Guide, Co-guide, Internal Guide, External Guide as applicable) (Optional)
 - (a) Name
 - (b) Designation
 - (c) Qualification and Experience
 - (d) Contact Address
 - (e) No. of current Ph.D. scholars under his/her supervision
8. **Field of Topic :**
9. **Recommendation of DAC [Clause 25]:**
 - (a) Utility of the proposed research programme
 - (b) Suitability of the applicant to undertake the programme
 - (c) Availability of infrastructure for undertaking the research programme
 - (d) Extent of External assistance required (if any)
 - (e) Recommendation for Ph.D. Enrolment
 - (f) Details of Qualifying courses assigned to the scholar:

| S.No. | Course No. | Course Title | Credit |
|--|------------|--------------|--------|
| [Attach syllabus for approval of Technical Council, if not approved] | | | |
10. **Any other Comments:**
11. **Signatures of the DAC Members.**

ANNEXURE - IV
MINUTES OF THE DEPARTMENTAL ACADEMIC COMMITTEE (DAC)/
CENTRE ACADEMIC COMMITTEE (CAC) FOR EXTENSION CAMPUS

MEETING

1. **Date of DAC Meeting**
2. **Name of the Department:**
3. **Name of the candidate and Roll No.**
4. **Affiliation :**
5. **Contact Address:**
Telephone / Mobile No./Email Id :
6. **Permanent Address :**
7. **Qualification of the candidate** (Degree with specialization, Year of passing, % marks and University)
8. **Details of Guides** (Guide, Co-guide, Internal Guide, External Guide as applicable)
 - (a) Name
 - (b) Designation
 - (c) Qualification and Experience
 - (d) Contact Address
 - (e) No. of current Ph.D. scholars under his/her supervision
8. **Research Topic**
9. **Recommendation of DAC [Clause 25]:**
 - (a) Utility of the proposed research programme
 - (b) Suitability of the applicant to undertake the programme
 - (c) Availability of infrastructure for undertaking the research programme
 - (d) Extent of External assistance required (if any)
 - (e) Recommendation for Ph.D. registration
 - (f) Details of Qualifying courses assigned to the scholar

| S.No. | Course No. | Course Title | Credit |
|--|------------|--------------|--------|
| [Attach syllabus for approval of Technical Council, if not approved] | | | |
 - (g) Doctoral Committee for the Scholar
10. **Any other Comments:**
11. **Signatures of the DAC Members.**

ANNEXURE - V

MINUTES OF THE 1ST MEETING OF THE DOCTORAL COMMITTEE

1. Date of Doctoral Committee Meeting:
2. Name & Affiliation of Candidate:
3. Registration No. & Roll No.
4. A.C. Date:
5. Receipt No. & date of submission of Registration Fees: [Mandatory for conducting the meeting]
6. Research Topic:
7. Guides (Guide, Co-guide, Internal Guide, External Guide as applicable):
8. Recommendation of Doctoral Committee:
 - (a) Details of any Additional /Audit course if recommended
 - (b) Justification for exemption of Qualifying Examination.
 - (c) Any other comments:
9. Signature of the Members of the Doctoral Committee:

ANNEXURE - VI

ANNUAL PROGRESS REPORT

1. Name of the Candidate and affiliation:
2. Date & No. of Annual Progress Presentation:
3. Registration Number & Roll No.
4. Date of submission of Registration Fees:
5. Receipt No. & Date of submission of Annual Fees: [**Mandatory for conducting Seminar**]
6. Date of Seminar
7. Title of Ph.D. Thesis:
8. Status of Qualifying Examination (Clause 28)
9. Details of audit courses, if any (Clause 29)
10. Progress of Research Work including Publication if any:
11. Comments of the Doctoral Committee
12. Signature of the Members of the Doctoral Committee:

ANNEXURE - VII

MINUTES OF THE MEETING OF THE DOCTORAL COMMITTEE ON PRE-PH.D. THESIS SUBMISSION SEMINAR

1. Date of Pre-Ph.D. Thesis Submission Seminar Presentation:
2. Name of the Department :
3. Name and Roll No.
4. Affiliation of Candidate :
5. Receipt No. & date of submission of Registration Fees: (Mandatory for conducting the meeting).
6. Title of the thesis:
7. Guides (Guide, Co-guide, Internal Guide, External Guide as applicable):
8. Comments of the Doctoral Committee:
 - (i) Does the title of the thesis require any modification : (If yes, state reason)
 - (ii) Organisation of the thesis :
 - (iii) Corrections in punctuation, grammar, spelling, typing or language:
 - (iv) Whether the thesis is acceptable for submission in its present form:
 - (v) Whether the thesis requires any modification/improvement prior to its final submission:
 - (vi) If the thesis requires modification/improvement, please specify:
(please attached separate sheet if required).
9. Recommendation of the Doctoral Committee:
10. Signatures of the members of the Doctoral Committee:

DECLARATION

I certify that

- a. The work contained in the thesis is original and has been done by myself under the general supervision of my supervisor(s).
- b. The work has not been submitted to any other Institute for any degree or diploma.
- c. I have followed the guidelines provided by the Institute in writing the thesis.
- d. I have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute.
- e. Whenever I have used materials (data, theoretical analysis, and text) from other sources, I have given due credit to them by citing them in the text of the thesis and giving their details in the references.
- f. Whenever I have quoted written materials from other sources, I have put them under quotation marks and given due credit to the sources by citing them and giving required details in the references.

Signature of the Student

Name

Roll No.

ANNEXURE - IX

APPROVAL OF THE GUIDE(S)

Recommended that the thesis entitled “
.....” prepared by
Mr/Ms under my/our supervision and guidance be accepted as
fulfilling this part of the requirements for the degree of Doctor of Philosophy.

To the best of my/our knowledge, the contents of this thesis did not form a basis for
the award of any previous degree to any body else.

Date:

Signature
(Name of the External Guide/Co-guide, if any)
Affiliation

Signature
(Name of the guide)
Affiliation

Annexure – X

A specific assignment shall be given to each student in every theory course immediately after registration by the Course Coordinator for concerned theory paper. This may comprise new problems in emerging areas in the subject/design methodology/discussion/ analysis etc. The main objective of the assignment is to improve self learning process and exposure to current literature on the subject. The assignment should be an extension of the prescribed syllabus and in no way repetition of the class work or problems. The assignment should be submitted by the students in hand written or to the Coordinator of the course after 12th week of commencement of the semester. The date for submission will be notified in the Academic Calendar. The evaluation of the assignment will be done by a three member Committee duly constituted by HOD, for each course periodically. The Grade/marks may be awarded as per the following norms:

- 9 or above Upto maximum of 20% of the total number of students
- 8 Upto maximum of 30% of the total number of students
- 7 Upto maximum of 40% of the total number of students
- 6 Upto maximum of 30% of the total number of students
- 5 Upto maximum of 20% of the total number of students
- <5 Upto maximum of 10% of the total number of students

Annexure – XI

DISCIPLINE

- i) Notwithstanding the provision contained in the clauses of the regulation, the Academic Council may cancel Ph.D. registration of any scholar at any time without assigning reason(s), if it is so satisfied.
- ii) Scholars are expected to observe disciplined behavior / manners inside and outside of the Institute / Campus so as to enhance the image of the Institute / Campus. Any act which may be considered derogatory shall not be acceptable.

ANNEXURE - X II
COVER PAGE

Margins:
Top: 1.25", Bottom: 0.86"
Left: 1.5", Right: 1"
1.5 Line spacing throughout

18, Arial Black
Bold Upper Case

**HYDRO JET SYSTEM FOR MINING
UNDER INDIAN ENVIRONMENT**

2 Blank Lines, 14 font

22, Minotype Corsiva

A Thesis

14, Arial, Bold Italics

SUBMITTED TO

16, Arial Black, Bold

BIRLA INSTITUTE OF TECHNOLOGY

1 Blank Lines, 14 font

1"x1" Logo



1 Blank Lines, 14 font

14 Arial Black, Bold

**FOR THE AWARD OF THE DEGREE OF
DOCTOR OF PHILOSOPHY**

14 Arial, Bold

in

ENGINEERING

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14 Arial, Bold

By

14 Verdana, Bold

VINAY SHARMA, M.E.

2 Blank Lines, 14 font

16 Arial, Bold

**DEPARTMENT OF PRODUCTION ENGINEERING
BIRLA INSTITUTE OF TECHNOLOGY
MESRA: RANCHI, INDIA**

2011