

**BIRLA INSTITUTE OF TECHNOLOGY
MESRA, RANCHI-835215**

**REGULATIONS FOR RESEARCH PROGRAMMES LEADING TO THE
AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY
2011**

PREAMBLE

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 Centre, wherever mentioned in these regulations, refers to an Extension Centre of the Institute. International Centre, wherever mentioned in these regulations, refers to an International Centre of the Institute.
2. The Regulations, hereinafter specified, lay down the procedure to be adopted for the research programme for the Ph.D. Degree of the Institute.
3. Department, wherever mentioned in these Regulations refers to a Department of the Institute.
4. Technical Council, wherever mentioned in these regulations, refers to the Technical Council of the Institute.
- 5.(i) A scholar is any 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.
- 5(ii) A Faculty member/Staff Member/Research Fellow in any Project sanctioned to the Institute/Institute Research Fellows shall be designated as **Internal Scholar** whereas those not falling in any of these categories/self financed scholar/ sponsored scholars shall be designated as **External Scholar**.

6. Guide/Co-guide/Internal guide/External guide is a person approved by the Technical Council for the guidance of the Scholar while pursuing the programme of research leading to Ph.D. degree of the Institute.

Objectives of the Ph.D. Programme

7. 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.

8. 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.

9. The testing and examination procedure to measure the achievement of these objectives is prescribed in these Regulations under appropriate headings.

Eligibility Qualification for the Ph.D. Programme

10. An applicant for admission to the Ph.D. programme of this Institute shall possess, normally, an M.Phil./Master's degree in Technology/ Engineering/ Pharmacy/ Management/ Architecture/ or equivalent, with a minimum of 60% marks for General candidates (55% in case of SC/ST candidates and, 55% in case of Full-Time Sponsored candidates with a minimum of three years professional experience) at Master's level or an M.Phil./Master's Degree in Science/Humanities with a minimum of 55% marks for General candidates (50% in case of SC/ST candidates and 50% in case of Full-Time Sponsored candidates with a minimum of three years professional experience) at Master's level or any other discipline approved by the Technical Council of the Institute

from time to time. However, if the final result of a candidate pursuing his/her Post Graduate course programme at the time of application is not declared, then he/she shall be governed by Clause 11.1 during the entire Ph. D. programme irrespective of when he/she obtains his/her Post Graduate final result (Please see Clauses 28 and 33).

Candidates must hold the required degree or equivalent qualification in appropriate discipline of any of the Universities incorporated by an act of the central or state legislatures in India or other educational institutions established by an act of Parliament or declared to be deemed as an University under section 3 of UGC Act, 1956, or possess an equivalent qualification recognized by the ministry of HRD, Government of India/Association of Indian Universities

11. Applicants with B.Tech /B.E./B.Sc. Engg./B.Arch./B. Pharm./M.B.B.S. having a First Class or minimum of 60% marks for General candidates (55% in case of SC/ST candidates, and 55% in case of Full-Time Sponsored candidates with a minimum of three years professional experience), at Graduation level, may also apply. This degree must entail a minimum of 4 years of education after higher secondary schooling (10+2) or equivalent.

12. However, an applicant having professional qualifications such as Associate Member of Institution of Engineers (India) / Aeronautical Society of India or equivalent may be considered for admission to the Ph.D. programme only after he/she completes the M.E. programme of any recognized university with a minimum of 60% marks (55% in case of SC/ST candidates, and 55% in case of Full-Time Sponsored candidates with a minimum of three years professional experience) at Master's level.

Notes:

(i) The category for the various research scholars is included in Annexure I.

(ii) Sponsored Candidates who are employed in recognized Educational Institutes / Universities / Colleges OR in Government / Defence / Research Laboratories OR in Industry, etc. Such candidates should normally have at least three years of experience.

(iii) Applicants with foreign diplomas should see the EdCIL website for equivalence (<http://www.edcil.co.in>), and if required should obtain an equivalence certificate well in advance from the evaluation division of the AIU (website <http://www.aiuweb.org>).

(iv) In case any Board / University awards grades instead of marks, the calculation of equivalent marks would be based on the procedure prescribed by the Board / University. In case a University does not have any scheme for converting CGPA into equivalent marks, the equivalence would be established by dividing obtained CGPA with the maximum possible CGPA and multiplying the resultant with 100.

(v) Foreign Nationals wishing to undertake research work or join Ph.D. programme, will have to obtain prior security clearance from Ministry of Home Affairs and the approval of the Department of Secondary & Higher Education, Ministry of Human Resource Development, Govt. of India / any other appropriate Govt Agencies, and this must be on the research visa endorsed to this Institute. (Please see UGC website for details)

(vi) Candidates must have adequate proficiency in written and spoken English. Foreign nationals, excluding ex-students and faculty/staff members of B.I.T. International Centres, possessing any of the qualification listed at 10, 11 (i), (ii) above shall be required to clear TOEFL or any other equivalent examination prescribed by the Technical Council of the Institute from time to time to become eligible for admission to the Ph.D. programme

(vii) Candidates with qualifications acquired through Government approved correspondence or distance-learning programmes are eligible only if (a) they acquired such qualifications as working professionals / while in employment, (b) the programmes are recognized by the DEC-UGC-AICTE or MHRD, (c) they have passed the qualifying examination at the time of applying, with minimum requisite marks as given in eligibility criteria. They must enclose photocopies of (i) work experience certificate (ii) pass certificate and marksheets of qualifying examination with their application.

Selection Procedure

Pre Admission Procedure

13. (i) The Ph.D. programme shall be open to candidates of any Nationality in true spirit of an University Education provided that the candidate satisfies any one of the clauses 10,11 or 12 and where equivalence of his/her qualifications is established by the Equivalence Committee of the Institute.

(ii) The admission into the Ph.D. Programme shall be made twice a year only through open advertisement, in January / July each year. Any applicant satisfying clause 13 (i), and seeking admission to the Ph.D. programme shall in the first instance submit an application in the prescribed Application Form to the Dean (Admission, 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.

(iii) The research areas of each of the department offering Ph. D. programme will be displayed on the Institute website.

14. (i) Selection to the Ph.D. programmes would be based on previous Academic record, Performance in an entrance test followed by an Interview at the Institute Main Building in the Institute's Campus at Mesra, Ranchi 835215

(ii) The Ph.D. Entrance Test would consist of 3 parts:

- a) General Aptitude Test common to all applicants, and
- b) Subject Specific Tests to examine basic fundamental knowledge in the subject which would reflect the ability of the candidates to address some complex problems.
- c) Oral test.

The syllabi of the General Aptitude Test and the Subject Specific Tests for each Department will be displayed on the Institute website.

(iii) 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 intimations will be sent to applicants.**

(iv) After submission of the required fees, the applicant will be assigned the Institute Roll No. He/She then shall immediately report to the concerned Head of the Department for necessary actions with his/her Enrollment Form (The Enrollment Form will be available at his/her Department office/office of the Dean Admissions).

Post Admission Procedure

15. Applicants provisionally admitted to the Ph.D. programme will be required to fill the Enrollment Form with details of their proposed field of research, research topic, and name of their guide, within 2 to 4 weeks after their admission, and submit the same **(Please see Clauses 24 & 25)** to the Dean, Doctoral Research, through the Head of the concerned Department.

Guide for the Scholar

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

- (a) a Full-time faculty member of the Institute and
- (b) a Ph.D. degree holder in the Institute with evidence of sufficient research in the proposed field of research.

or

- (c) a Professor of the Institute holding atleast 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 Technical Council normally may restrict the number of Ph.D. scholars at a time under a guide to three for a an Assistant Professor with AGP of Rs. 6000/- and six for a an Assistant Professor with higher AGP, and eight for an Associate Professor/Professor. In case of joint supervision the number would be counted as half as a special case and the same shall have to be approved by the Technical Council.

17. (i) If considered necessary, the Technical 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, possessing qualifications consistent with clause 16. In such a case, teacher/expert so appointed, shall be designated as co-guide/external guide as may be the case.

(ii) Any addition of an additional guide or replacement of the original guide excluding his/her resignation/superannuation/demise, within a time span of one year before the submission of thesis will not be permitted.

18. Also, in the event, the Technical Council permits an applicant from another institution/organization to be admitted to the Ph.D. Programme at the institute, the Technical Council may approve joint supervision of scholar's work by a suitably qualified external guide after examining his/her biodata. The application of such an external candidate must be forwarded by a competent authority of applicant's institution/organization. In this case, the internal guide shall be in accordance with clause 16. However, for industries/organizations located in and around Ranchi, the Technical Council may waive the requirement of an external guide.

19. 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 Technical Council to pursue his/her Ph.D. proramme 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.

Function of the Guide(s)

20. The functions of the Guide/Internal 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, PG and Research (DAC, PG & R)**, 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 Technical Council.

21. 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.

Residence Requirement for External Scholar at this Institute/Extension Centre.

22. The residential requirement is essential to build the research atmosphere in the Institute. The residential requirement for external Ph.D. candidate will, normally be 24 weeks at the Institute/Extension centre. The duration of residency may be spread over the duration of research activity. However, the Technical Council may waive residency requirement for scholars from the Institution/organizations located in and around Ranchi.

Departmental Academic Committee, Post Graduate and Research (DAC, PG & R)

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

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

Action by the Departmental Academic Committee Post Graduate and Research (DAC, PG & R)

24. Subsequently, the Departmental Academic Committee shall call the applicant for counseling on a date and time convenient to the members of the Committee to discuss his/her Research Programme and selection of guide(s) before filling up the enrollment form. If necessary, the DAC (PG & R) may consult the proposed guide(s) for his/her consent. The Chairman, DAC (PG & R) shall permit one week time to the scholar to interact with faculty members of the department to facilitate him/her in selection of the guide(s).

25. (i) The candidate shall prepare the synopsis of the proposed Ph.D. research programme in consultation with his/her guide(s) within 2-4 weeks time and submit his/her enrollment form along with the synopsis to the concerned Chairman, DAC(PG & R).

25 (ii) The scholar shall present a seminar on his/her proposed research work before the DAC (PG & R) members on a date and time notified by the Chairman, DAC(PG & R), anytime within six months from the date of admission..

25(iii) The DAC(PG & R) will assess the research proposal of the candidate and submit its recommendations in the prescribed format (Annexure – II) to the Vice-Chancellor through the Dean (Doctoral Research) covering the following aspects:

- (a) Proposed field of Research
- (b) Research Topic

- (c) The name(s) of the Guide(s)
- (d) Utility of the proposed research programme.
- (e) Suitability of the applicant to undertake the programme.
- (f) Availability of infrastructure for undertaking the research programme.
- (g) Extent of external assistance required (if any)
- (h) Proposed Doctoral Committee of the Scholar (As per Clause 31)

If all the requirements are met then recommendations along with the proposed Doctoral Committee for the candidate shall be sent to the Vice Chancellor through the Dean (Doctoral Research) for his perusal and placement before the Technical Council.

26. (i) Once the Technical Council has approved the Guide(s) and Doctoral Committee, actual executive orders constituting the Committee will be issued by the Registrar.

All concerned will be intimated of the registration of the scholar by the Registrar. **The date of admission to the Ph.D. Programme shall be the date of registration.**

26. (ii) After the candidate is duly-registered, any change in the department or place or centre of the guide/internal guide, shall not alter the processing department/centre and the scholar may continue to work under the supervision of the same guide.

26. (iii) For cases where the guide has supervised the scholar for two years or more :

(a) If the sole guide proceeds on long leave for more than six months, a joint guide should be appointed by the Doctoral Committee. However, if the leave is less than six months, the Chairman, DAC (PG & R) shall look after the responsibilities of the guide during his/her absence.

(b) A person superannuating will continue to be the sole guide if the thesis is submitted within six months.

(c) If the thesis is not ready for submission within six month a joint guide must be appointed by the Doctoral Committee.

26. (iv) For a case where guidance has been given for less than two years:

(a) When a person proceeds on leave for more than six months, a joint guide be appointed by the Doctoral Committee. However if the leave is for two years or more the person shall cease to be a guide.

(b) A person superannuating will continue as the guide if the thesis is submitted within six months time, otherwise an another person will have to be appointed as the sole guide in his/her place.

26. (v) After superannuation from the service of this institute if a person joins the Institute as an Emeritus Professor/ Scientist or in any other capacity, he may continue to be the sole guide or as joint guide if the Doctoral Committee so recommends.

Note: A persons re-employed after superannuation shall continue to hold the same status in the matter till the end of the period of re-employment.

26. (vi) No Faculty who has less than or equal to two years of service left from the end of the academic session in the month of June of the year he/she superannuates can be appointed a thesis guide singly.

26. (vii) Persons from the 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 only jointly with a regular teacher and not alone.

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

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

27. The Registration for Ph.D. Programme will normally be valid for a duration of six years. In case the candidate fails to submit his work within 6 years, he/she would be required to make a fresh application for Registration. However, the submission of thesis

for such candidates may be done at any time after Registration, but within a maximum period of two years.

Pre-Ph.D. Qualifying courses:

28.(a) **All Ph.D. Scholars with M.E./ M.Tech. /M.Pharm/ M.Arch/ M. Planning/ MBA (after B.E./B.Tech/M.Sc./M.A./M.Com. or equivalent) or equivalent qualification will be required to complete the following courses in one year (two semesters) after registration to the Ph.D. Programme.**

First Semester:

- (i) Theory courses related to the discipline of research : 2 unit (Atleast)
- (ii) Term papers related to the discipline of research. : 3 unit

Second Semester:

- (i) Theory courses related to research methodology/
Computational Technique/Scientific Computing/
Data analysis, etc. : 2 unit
- (ii) Project based on Literature Review/ Research
Methodology, IPR, Plagiarism, etc. related to the
domain of research: 3 unit

28.(b) **All Ph.D. Scholars with MBA (after B.A./B.Sc./B.Com. or equivalent)/M.Sc./MCA qualification will be required to complete the following courses in one year (two semesters) after registration to the Ph.D. Programme.**

First Semester:

- (i) Theory courses related to the discipline of research : 2 unit (atleast)
- (ii) Term papers related to the discipline of research : 4 unit

Second Semester:

- (i) Theory courses related to research methodology/
Computational Technique/Scientific Computing/
Data analysis, etc. : 2 unit
- (ii) Project based on Literature Review/ Research
Methodology, IPR, Plagiarism, etc. related to the
domain of research : 4 unit

28.(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 two years (four semesters) after registration to the Ph.D. Programme.**

First Semester:

- (i) Theory courses related to the discipline of research : 2 unit (atleast)
- (ii) Term paper related to the discipline of research. : 1 unit
- (iii) Laboratory course work/seminar : 2 unit

Second Semester:

- (i) Theory courses related to research methodology/
Computational Technique/Scientific Computing/
Data analysis, etc. 2 unit (Atleast)
- (ii) Term paper(s)/projects related to the discipline of
research. : 2 unit
- (iii) Seminar : 1 unit

Third Semester:

- (i) Theory courses related to the domain of research : 2 unit (Atleast)
- (ii) Term paper/project related to the domain of research: 1 unit
- (iii) Laboratory Course work/Seminar : 2 unit

Fourth Semester:

- (i) Comprehensive Report on the domain of research : 5 unit

28(d) The maximum duration for completion of the course programmes will be two years for categories 28.(a) & (b) and three years for category 28.(c).

28(e) The theory courses shall be offered through class room instructions/directed studies.

29. **If a scholar successfully completes his/her Pre-Ph.D. qualifying courses as mentioned in Clause 28.(a) , 28.(b) or 28 (c) above, as the case may be, he/she will be awarded the Degree of Master of Philosophy (M.Phil.) of the Institute.**

30.(a) Scholars will be encouraged to take up a foreign language such as French/German/Russian, etc. as a Non-credit course during the programme.

30.(b) A scholar of the Ph.D. Programme may be advised to take appropriate/audit courses at the postgraduate levels at the Institute, without payment of any fees, to make up for his deficiencies or as a help in preparation for the written qualifying courses.

30.(c.i) However, in case of a teacher of this Institute pursuing the Ph.D. programme, the Doctoral Committee may exempt the scholar from taking the written qualifying examination in the courses, provided he/she has been teaching the courses at the postgraduate level for a minimum of two years.

30.(c.ii) Similar exemption may be granted to a scholar if he/she had passed an examination on the subject(s) in his/her P.G. course and has secured not less than B grade (50% marks) in the subject/subjects, provided that he/she had taken the examination not earlier than **three** years from the date of his/her application.

30.(c.iii) Similar exemption may be granted to a scholar if he/she had passed an examination on the subjects in his/her M.Phil. course with specialization related to the domain of proposed research, provided that he/she had taken the examination not earlier than **three** years from the date of his/her application.

30. (c.iv) However, the scholars availing exemption under section 30.(c.i), 30. (c.ii) or

30. (c.iii) will not be eligible for the award of the Degree of Master of Philosophy (M.Phil.) of Institute.

30. (c.v) However, the course works mentioned in second semester (ii) of Clause 28(a) and (b) shall be compulsory for all scholars.

Doctoral Committee

31. (i) The Doctoral Committee for a scholar in any department of the institute shall consist of normally five members as given below:

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

31. (ii) For Extension Centres, the Doctoral Committee shall consist of the following members:

- (a) The Director/Coordinator - Chairman
- (b) The Guide(s) - Member(s)
- (c) Atleast one teacher of the centre- Member
- (d) Two faculty members nominated by the Vice-Chancellor - Members

31. (iii) For research in emerging and interdisciplinary areas the case shall be referred to the Dean (Doctoral Research) for specific actions.

The members of the Doctoral Committee other than the Chairman drawn from the faculty should normally possess a research degree/research experience of proven merit.

Function of the Doctoral Committee

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

(a) Shall recommend the qualifying courses for the scholar as specified in clause 28 to 30 and as approved by the Technical Council. The recommendation in the prescribed format (Annexure III) shall be submitted to the Dean (Examinations) through Dean (Doctoral Research) for conducting the qualifying examination.

(b) Shall make at least yearly review of the scholar in his/her research work, in association with the guide/guide and co-guide/internal & external guides, if any, as may be feasible.

(c) Shall forward annual report to the Vice-Chancellor, through Dean (Doctoral Research) on the progress of scholar's research programme in the prescribed format (Annexure IV).

(d) Suggest suitable remedial action to the appropriate authority if the scholar's progress is not satisfactory for any reason.

(e) 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 prescribed format (Annexure – V) through the Dean (Doctoral Research), to the Vice Chancellor.

(f) When scholar submits his/her thesis, the Doctoral Committee, after due verification of the compliance requirements under clause 33, shall recommend names of examiners for the evaluation of the Thesis. These names shall be in the form of a panel, and this shall be submitted through Dean (Doctoral Research) to the Vice-Chancellor for approval by the Technical Council.

(g) On receipt of the observations/recommendation of the examiners of the thesis, shall submit these with the Committee's recommendations to the Vice-Chancellor through the Dean (Doctoral Research) for further necessary action. In the event, the reports of the examiners are favourable to the scholar as provided for in clause 41, then the doctoral Committee would also recommend names for the Viva-voce Board of the Scholar.

Compliance Report:

33. Prior to the submission of the thesis, the scholar registered for the Ph.D. Programme either at the Institute or its Extension Centres 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, if applicable, as provided for in Clause 22 of these Regulations.

(c) He/She should have taken and passed the prescribed qualifying examination and course works as provided for in Clauses 28 and 30.(a & b) of these Regulations, if so decided by the Technical Council.

(d) He/She must have published at least one research paper in a referred journal of repute and this is to be certified by the Chairman, Doctoral Committee.

(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 Centres, the Doctoral Committee shall decide the venue of presentation.

Organization of the Thesis:

34. 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.

35. The thesis must contain besides the text and common matters like Bibliography/References and summary/Conclusions:

(i) A Preface/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 VIII.

(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.

The scholar may adopt the following standard.

Citation in text

The Scholar must ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given

in full. Citation of a reference as "in press" implies that the item has been accepted for publication.

Web references

As a minimum, the full URL should be given. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Reference style

Text: All citations in the text should refer to:

1. *Single author*: the author's name (without initials, unless there is ambiguity) and the year of publication;
2. *Two authors*: both authors' names and the year of publication;
3. *Three or more authors*: first author's name followed by "et al." and the year of publication.

Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically.

Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown..."

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

Examples:

Reference to a journal publication:

Coffey, C.S., 1994. Quantum-mechanical aspects of dislocation motion and plastic flow. *Phys. Rev.* 49, 208-214.

Sklad, P.S., Gibala, R. and Mitchell, T.E., 1973. Amplitude dependent internal friction of molybdenum single crystals. *J. Phys. F: Metal Phys.*, 3, 1789- 1795.

Reference to a paper in the proceedings of a conference:

Holzwarth, U. and Seeger, A., 1991. in: Brandon, D.G., Chaim, R. and Rosen, A. (Eds.), *Proceedings of the 9th International Conference on Strength of Materials*, Freund Publications House, London, p. 577-576.

Reference to a book:

Hull, D. and Bacon, D.J., 2001. *Introduction to Dislocations*, 4th Edition, Butterworth – Heinemann, Oxford, pp. 182 – 187.

Reference to a chapter in an edited book:

Mettam, G.R., Adams, L.B., 1999. How to prepare an electronic version of your article, in: Jones, B.S., Smith, R.Z. (Eds.), *Introduction to the Electronic Age*. E-Publishing Inc., New York, pp. 281-304.

(v) A Certificate (in standard format, Annexure VI) 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 VII.

(vii) The text in the thesis shall be Times New Roman font size 12. All Figures and Tables shall have appropriate legend .

36. 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.

37. 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.

Adjudication of Thesis:

38. On successful completion of his/her research programme, the scholar shall submit FOUR (FIVE in case of joint supervision) hard copies and one soft copy in CD of his/her thesis and synopsis to the Chairman of the Doctoral Committee through his/her guide(s) after paying examination fees as decided by the Institute from time to time.

39. 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 Technical 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) The Guide/Guide and Co-guide/Internal Guide and External guide for scholar
- (b) Two external experts, one from within the country and the other from outside the country

40. 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 (Doctoral Research).

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

42. 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 Technical Council may permit resubmission of the thesis after revision within two years from the date of the Technical 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.

43. 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.

44. For unanimous/majority rejection of the thesis, the scholar shall be dropped automatically from the Ph.D. programme.

Viva-voce Board

45. In the event, the Technical Council is satisfied with the recommendations of the Board of Examiners setup for adjudication of the thesis, the Technical Council will appoint a Viva-voce Board as per the recommendations of the Doctoral Committee, composed as under.

- (a) Chairman (Doctoral Committee) : Chairman
- (b) One external examiner preferably : Member

from within the country

- (c) All members of the Doctoral Committee : Members
- (d) Guide(s) : Member(s)
- (e) Dean (Doctoral Research) : Observer

46. 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 Technical 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.

47. In the case of a teacher permitted to work independently without any guide as per clause 19 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 Technical Council on the recommendations of the Doctoral Committee.

48. Notwithstanding the provision contained in the clauses of the regulation, the Technical Council may cancel Ph.D. registration of any scholar at any time without assigning reason(s), if it is so satisfied.

Award of the Ph.D. Degree

49. The **basic discipline** of the scholar (Science/ Technology/ Engineering/ Architecture/ Pharmacy/Medical Sciences/Management/Humanities or any other discipline approved by the Technical Council) and his/her **domain of research** will jointly determine the discipline in which the Ph.D. degree will be awarded.

Annexure I

BIRLA INSTITUTE OF TECHNOLOGY Mesra, Ranchi - 835215

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

SI 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 Centres + BIT International Centres	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

MINUTES OF THE DEPARTMENTAL ACADEMIC COMMITTEE (DAC) MEETING

1. **Date of DAC Meeting**
2. **Name of the Department:**
3. **Name of the candidate and Affiliation:**
4. **Contact Address:**
5. **Qualification of the candidate** (Degree, Year of passing, % marks and University)
6. **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
7. **Research Topic**
8. **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) Doctoral Committee for the Scholar
9. **Any other Comments:**
10. **Signatures of the DAC Members.**

ANNEXURE – III

MINUTES OF THE 1ST MEETING OF THE DOCTORAL COMMITTEE

1. Date of Doctoral Committee Meeting:
2. Name & Affiliation of Candidate:
3. Registration No.
4. T.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 Qualifying courses: [Clause 28 & 29]

S.No.	Course No.	Course Title
.		

[Attach syllabus for approval of Technical Council]
 - (b) Details of any Audit course if recommended [Clause 30]
 - (c) Any other comments:
9. Signature of the Members of the Doctoral Committee:

ANNEXURE – IV

ANNUAL PROGRESS REPORT

1. Date of Annual Progress Presentation:
2. Name of the Candidate and affiliation:
3. Registration Number :
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 & 29)
9. Details of audit courses, if any (Clause 30)
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 – V

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 Affiliation of Candidate:
4. Receipt No. & date of submission of Registration Fees: (Mandatory for conducting the meeting).
5. Title of the thesis:
6. Guides (Guide, Co-guide, Internal Guide, External Guide as applicable):
7. Comments of the Doctoral Committee:
 - (i) Does the title of the thesis require any modification:
 - (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).
7. Recommendation of the Doctoral Committee:
8. Signatures of the members of the Doctoral Committee:

ANNEXURE – VI

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

Margins:
Top: 1.25", Bot.:0.86"
Left: 1.5", Rt.: 1"
1.5 Line spacing throughout

18, Arial Black
Bold Upper Case

HYDRO JET SYSTEM FOR MINING UNDER INDIAN ENVIRONMENT

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A Thesis

14, Arial, Bold Italics

SUBMITTED TO

16, Arial Black, Bold

BIRLA INSTITUTE OF TECHNOLOGY

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1"x1" Logo



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

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in

ENGINEERING

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By

VINAY SHARMA, M.E.

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2 Blank Lines, 14 font

16 Arial, Bold

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MESRA: RANCHI, INDIA**

2004

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 Scholar

**Rules and Regulations for
The Doctor of Philosophy (Ph.D.) Programme
(including provision for M.Phil.)**



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Deemed University under section 3 of UGC Act, 1956
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2011