

**REGULATIONS  
FOR  
DOCTOR OF PHILOSOPHY  
R2010**

( With all amendments incorporated upto October 2010 )



**ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE  
COIMBATORE - 641 047.**

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**ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE**  
**REGULATIONS FOR DOCTOR OF PHILOSOPHY**  
**R2010**

**DEFINITIONS AND NOMENCLATURE**

In the Regulations, unless the context otherwise requires,

- i. "University" means Anna University of Technology, Coimbatore, Coimbatore 641 047.
- ii. "Board of Research" means the Board duly constituted by the Vice-Chancellor of the University to oversee the academic research activities of the University.
- iii. "Programme" means Doctoral Programme leading to the award of Ph.D. in Engineering / Technology / Science and Humanities / Management Sciences, etc.
- iv. "Chairman/Chairperson" means Head of the Faculty.
- v. "Supervisor" means any faculty member of the University or outside the University who has been recognized by the University to guide the research scholars.
- vi. "Joint Supervisor" means a recognized Supervisor to guide the scholars in interdisciplinary research that require more than one expert or to take care of the administrative and research responsibilities of the scholar, if the Supervisor retires from service.
- vii. "Head of the Department" means Head of the Department of the Supervisor.
- viii. "Doctoral Committee" means a Committee constituted by the University for each scholar to monitor the progress of his/her research work.

- ix. "Ex-officio Member" means the Head of the Department of the Supervisor.
- x. "Research Co-ordinator" means Head of the Institution / Department / Organization of the scholar.
- xi. "Scholar" means any candidate admitted by the University either under Full-time or Part-time category for pursuing research for the award of Ph.D. degree of the University.
- xii. "Specialization" means the discipline of the Post Graduate Degree Programme such as Environmental Engineering, Applied Electronics, Physics, etc.
- xiii. "Course" means a theory subject of PG programme that is prescribed by the Doctoral Committee for the scholar to undergo as a part of the programme requirement.
- xiv. "Special Elective" means any theory subject/laboratory/field work specific to the area of research designed by the Supervisor, recommended by the Doctoral Committee and approved in the Board of Study and Academic Council.

## 1. GENERAL ELIGIBILITY

- 1.1 Master's Degree of this University or any other qualification recognized as equivalent thereto in the fields of study notified from time to time by the University. Specific educational qualifications are given in Clause 2.
- 1.2 Bachelor's Degree in Engineering/Technology of the University or any other qualification recognized as equivalent thereto in the fields of study with a minimum of 15 years of R&D experience in National Research Laboratories / Public sector undertakings and with minimum of three publications in referred impact factor journals or two international patents in the last five years.
- 1.3 A minimum of 55% marks or CGPA of 5.5 on a 10 point scale in the qualifying examination (50% marks or CGPA of 5.0 on a 10 point scale for SC/ST candidates).

For M.A. (English) Degree holders including SC/ST candidates, a minimum of 50% marks or CGPA of 5.0 on a 10 point scale.

- 1.4 The Clause 1.3 does not apply, if the qualifying degree is M.Tech. (By Research) of the University or recognized as equivalent.

## 2. EDUCATIONAL QUALIFICATIONS

	<b>Programme</b>	<b>Qualification for Admission</b>
(i)	Ph.D. Degree in Engineering / Technology	M.E. / M.Tech. / M.S. (By Research) / M.Pharm. in the relevant branch of Engineering or Technology
(ii)	Ph.D. Degree in Science and Humanities	M.Sc. / M.A. / M.S. (By Research) in the relevant branch of Science and Humanities / M.C.A.

(iii)	Ph.D. Degree in Management Sciences	MBA / Post Graduate Diploma in Business Management or Administration awarded by Indian Institute of Management (IIM) / M.S. (By Research) in Management Sciences and equivalent
(iv)	Ph.D. Degree in Architecture and Planning	M.Arch. / M.Plan. / M.S. / M.Tech (By Research) in Architecture and Planning

### 3. Ph.D. PROGRAMME

Two categories of Ph.D. programme available are: Full-time and Part-time (Internal / External). Candidates who satisfy the eligibility criteria as in Clauses 1 & 2 are eligible to apply for Ph.D. Programme.

#### 3.1. Full-time Ph.D. Programme

3.1.1 Candidates under Full-time shall do research work in the University and its affiliated Colleges and shall be available during the working hours for curricular, co-curricular and related activities.

3.1.2 Candidates working in the projects undertaken from State / Central / Quasi Government and totally funded through the projects in the University Departments / Colleges affiliated to the University. If the Principal Co-ordinator / Investigator of such projects are recognized Supervisor of the University, the scholar shall register for research programme under such Supervisor only. The scholar should be appointed in a project sanctioned by a funding agency/organization atleast for a period of two years. Part employments in different spells or in different projects are not permitted. The Department/Centre where the project is undertaken should be a recognized research centre of the University.

- 3.1.3 Candidates in employment, who want to pursue Full-time study, should be sponsored by their employer and should avail leave for the minimum duration of the programme (Clause 10) and should get formally relieved from their duty to join the research programme.
- 3.1.4 Candidates who are sponsored by AICTE under Quality Improvement Programme for teachers of Engineering Colleges and who satisfy the eligibility conditions shall apply for Full-time category only, in the Specializations as notified in the AICTE guidelines.
- 3.1.5 Candidates who are selected at National level Fellowship programmes or by any recognized bodies and who satisfy the eligibility conditions as per the regulations shall apply for Full-time category in the respective specialization.
- 3.1.6 Foreign Nationals sponsored by the Government of India on any exchange programme and who satisfy the eligibility conditions as per the regulations shall apply for Full-time category in the respective specialization.

### **3.2 Part-time Ph.D. Programme**

The following categories of candidates are eligible to apply under Part-time programme.

- 3.2.1 Full-time teachers of University Departments/Colleges affiliated to the University.
- 3.2.2 Candidates working in Industrial Units / R&D Departments / National Laboratories / Units of Government / Quasi Government or any other research laboratories, approved research Centers which are recognized by the University to do collaborative research with the University and sponsored by the respective employer.

Note (i) The Eligible candidates working in university departments are classified as part time (internal).

(ii) Teachers of affiliated colleges in Clause 3.2.1 and candidates as mentioned in Clause 3.2.2 are classified as Part time (External). The nomenclature shall continue for the above scholars till they are in research.

3.2.3. Candidates working in Approved Research Centre of Anna University of Technology, Coimbatore only are eligible for admission.

### **3.3 Change of Category**

3.3.1 The change of category of provisional registration shall be permitted subject to the recommendation of the Doctoral Committee.

3.3.2 The change of category shall be approved by the Director (Research) subject to submission of necessary documents along with the approval of the Doctoral Committee.

## **4. PLACE OF RESEARCH**

The place(s) of research in respect of Full-time/Part-time programme are as under:

### **4.1 Full-time Programme**

4.1.1 The Full-time programme shall be undertaken in the University Departments / Government Engineering Colleges and approved research departments of the Colleges affiliated to the University and approved research centres.

4.1.2 The place of research for the project scholars mentioned in Clause 3.1.2 shall be the Department / Institution where the project is undertaken.

4.1.3 Full-time scholars shall necessarily sign in the attendance register on all working days at the respective place of research.

#### **4.2 Part-time Programme**

4.2.1 The place of research for teachers of Colleges affiliated to the University (as specified in Clause 3.2.1) shall be the College where the Supervisor is working.

4.2.2 The place of research for the scholars working as per Clause 3.2.2 shall be the College where the Supervisor is working. The facilities in Industrial Units / R&D Departments / Laboratories / Units of Government / Quasi Government / Recognized research laboratories shall also be availed for research.

#### **5. MODE OF SELECTION**

5.1 The candidates desirous of registering for Ph.D. Programme shall apply online with the University website, fill-in all the necessary details and submit through proper channel wherever applicable, before the due date as indicated in the notification issued from time to time. Normally the University shall issue notification for Ph.D. admission twice in a year.

5.2 Incomplete applications in any respect shall be summarily rejected without any intimation to the candidate.

5.3 The applications of the eligible candidates shall be processed by Committees constituted by the Director (Research) for the purpose of selection. The composition of such Committees shall be decided by the Director (Research) with the approval of Vice-Chancellor, taking into account the number and nature of applications received.

5.4 Such Committees shall screen the applications as per the eligibility norms and be responsible for the conduct of test and interview for

the eligible candidates. Based on the performance in the test and interview, the successful candidates shall be short listed by the above Committees.

- 5.5 Candidates qualified in NET/SLET/other National Level Eligibility Test are exempted from written test and they have to appear for the interview only.

## **6. ADMISSION**

- 6.1 The Board of Research constituted by the Vice-Chancellor shall approve and recommend the short listed candidates for admission to the doctoral programme in the appropriate Specialization, after giving due consideration to the interdisciplinary fields of research, if any, and the Faculty in which the candidate shall be registered.

The Candidates from nine districts viz., (Coimbatore, Dharmapuri, Erode, Karur, Krishnagiri Namakkal, Salem, Tirupur and The Nilgiris) and employees of recognized research centres are eligible to apply.

- 6.2 Selected candidates shall be provisionally registered for Ph.D. programme with the approval of the Vice-Chancellor either in January or July session.
- 6.3 The period of provisional registration shall be normally January or July of the year in which the candidate is admitted.

## **7. SUPERVISOR RECOGNITION**

- 7.1 The applicant should possess Ph.D. degree in the relevant area of research in which he/she proposes to guide the scholar.
- 7.2 The applicant for Supervisor recognition shall be working Full-time faculty in the University Departments / Colleges affiliated to the University or employed full time in the places as indicated under Clause 3.2.2.

- 7.3 The applicant shall have a minimum of two publications to his/her credit in referred impact factor journals with a minimum of two years Teaching / Research experience after obtaining the Ph.D. degree (or) the applicant shall have a minimum of two publications to his/her credit in referred impact factor journals within a period of three years preceding his/her date of application for recognition.
- 7.4 Recognition as Supervisor for guiding research work shall be issued on the recommendation of the Board of Research and approval of the Vice-Chancellor.
- 7.5 For interdisciplinary research that require more than one expert the Joint Supervisor shall be approved by the Board of Research or the Director (Research) with the recommendation of the Doctoral Committee.
- 7.6 A Supervisor shall entertain fresh registration of scholars under him/her upto one year prior to his/her superannuation or leaves service, and a Joint Supervisor is mandatory in such cases.
- 7.7 If before submission of the thesis by the candidate, the research supervisor crosses the age of 62 or leaving the institution and unable to guide, the candidate will be allotted to some other suitable supervisor by the Director Research.
- 7.8 Contacting of Thesis examiners by the Supervisor/Joint Supervisor after the submission of Synopsis/Thesis of his/her scholar in connection with the evaluation report shall lead to the withdrawal of his/her supervisorship for a period of three years and he/she shall be debarred from guiding the scholars for any research programme in the University till such period.
- 8. CHANGE OF SUPERVISOR**
- 8.1 When a Supervisor of a scholar happens to be away from the University, for more than six months and upto one year, he/she shall continue to guide the scholar, but a Supervisor-in-charge shall be nominated by the Director (Research) based on the request of the

Supervisor and / or the recommendation of the Head of the Department of the Supervisor. The Supervisor-in-charge shall function till the Supervisor returns.

- 8.2 When a Supervisor of a scholar happens to be away from the University for more than one year, an alternate Supervisor shall be nominated by the Director (Research) based on the request of the Supervisor and / or the recommendation of the Head of the Department of the Supervisor.
- 8.3 When a Supervisor retires from service on superannuation or leaves service, he/she shall make arrangements for an alternate Supervisor for his / her scholar. However, the Supervisor who retired from service shall continue to guide a scholar on his/her written request, provided he/she has guided the scholar continuously for two years and the provisional registration of the scholar is confirmed or the scholar has submitted the Synopsis. However a Joint Supervisor shall be nominated by the Director (Research) based on the request of the Supervisor and / or the recommendation of the Head of the Department of the Supervisor to take care of the administrative and research responsibilities of the scholar.
- 8.4 When a Supervisor migrates to other University / non-recognized department of the University, an alternate Supervisor shall be nominated by the Director Research on the approval of Vice Chancellor to take care of the administrative and research responsibilities of the scholar.
- 8.5 Generally change of Supervisor is not permissible. It may be permitted only under extreme conditions such as death of the Supervisor or disability or other medical conditions or any other legal actions on the Supervisor by the administration. However, if there is any conflict

between the Supervisor and the Research Scholar, it has to be immediately referred to the Director – Research, whose decision has to be placed before the Vice –Chancellor for final decision.

- 8.6 If the Institution in which the scholar works becomes Private University or the scholar migrates to other University, such scholar shall be permitted to continue the research work in the University and to submit the Thesis under the same Supervisor, provided his / her provisional registration is confirmed.
- 8.7 If the Institution(s) affiliated to the University becomes Private University, then the recognized Supervisors working in such institutions shall be permitted to guide the scholars, if their provisional registration is confirmed. Such Supervisors cannot be permitted to take additional scholars. However a Joint Supervisor shall be nominated by the Director (Research) based on the request of the Head of the Department of the Supervisor to take care of the administrative and research responsibilities of the scholar.

## **9. NUMBER OF SCHOLARS**

- 9.1 A Supervisor shall guide only a maximum of twelve (Ph.D. /M.Tech.(By Research) put together) scholars as Supervisor/Joint Supervisor at any time. Additional scholars, if any under extraordinary circumstances, shall be decided on the merit of the cases, with prior approval of the Vice-Chancellor.
- 9.2 For University Departments, a Joint Supervisor is mandatory, if the Supervisor is not a regular faculty member of the University. Further a maximum of Six (Ph.D. / M.Tech. (By Research) put together) scholars only be permitted under such Supervisor.

## **10. DURATION OF THE PROGRAMME**

- 10.1 The duration of the programme and the time for submission of Thesis are counted from the date of provisional registration vide Clause 6.3.
- 10.2 The minimum duration of the programme in Engineering, Technology, Architecture and Planning, and allied programmes for **Full-time / Part-time** shall be **two / three** years respectively.
- 10.3 The minimum duration of the programme in Science & Humanities for Full-time / Part-time shall be three/four years respectively. However, for M.Phil. Degree holders, the minimum duration shall be reduced by one year, if the M.Phil. Degree relates to the field of research of the programme.
- 10.4 The minimum duration of the programme in Management Science for Full-time/Part-time shall be as in Clauses 10.2 / 10.3 for scholars with Engineering and Technology / Science and Humanities background respectively.
- 10.5 If a Full-time scholar completes his/her minimum duration of the programme as in Clauses 10.2, 10.3 and 10.4 and his / her provisional registration is confirmed, he/she shall be permitted to change the category, if necessary, with prior approval from the Director (Research).
- 10.6 The Director (Research) shall permit, if deemed fit for reasons, break of study for the scholar under extraordinary circumstances such as medical grounds and other compelling reasons which warrants his/her absence to the programme.
- 10.7 Break of study to scholars shall be granted upto a maximum period of **two years not exceeding one year at a time**. Such request with

the recommendation of the Supervisor and Head of the Department should reach the Director (Research) prior to availing the break of study. Break of study period shall be accounted for the counting of duration of the programme (Clause 10). The scholar should remit the semester fees during the break of study period.

10.8 The maximum duration for the programme shall be **six** years.

## **11. EXTENSION OF MAXIMUM DURATION**

11.1 In exceptional circumstances, if the Doctoral Committee recommends and the Board of Research deems it fit, a maximum grace period of two years, six months at a time, beyond the normal maximum period of six years may be granted by the Vice-Chancellor to enable the scholar to submit the Thesis. In such cases, penalty fees as prescribed from time to time shall be paid.

11.2 Request for such extension (six months at a time) shall be applied to the Director (Research), with the recommendation of the Doctoral Committee, atleast one month prior to the end of the maximum period or expiry of the previous extension.

11.3 If the scholar fails to submit the Thesis within the extended period of two years, the registration shall be cancelled and the name be removed from the rolls.

## **12. DOCTORAL COMMITTEE**

12.1 There shall be a Doctoral Committee for every scholar to monitor the progress of research work.

12.2 For every scholar, the Supervisor shall furnish a panel of six experts with doctoral qualification in the field of proposed research, from the faculty members of the University / Colleges affiliated to the University / other Universities/ experts from R&D Departments / National Laboratories / any other research laboratories / research centre

from which two will be recommended **by the Director Research with the approval of Vice-Chancellor.**

- 12.3 The Supervisor of the scholar shall be the convener of the Doctoral Committee.
- 12.4 The Joint Supervisor, if applicable, shall also be a member.
- 12.5 The Head of the Department of the Supervisor shall be an ex-officio member.
- 12.6 If the Supervisor and the scholar are from different Institutions / Organizations, the Head of the Institution / Department / Organization of the scholar shall be the Research Co-ordinator.
- 12.7 If a Doctoral Committee member is away from his/her place of work for a long period, the Supervisor shall request for an alternate member from the panel of experts submitted as per Clause 12.2.

### **13. PROGRAMME STRUCTURE**

#### **13.1 Course Work**

- 13.1.1 The Doctoral Committee of a scholar shall meet within three weeks from the date of communication of his/her provisional registration to prescribe the course works.
- 13.1.2 A minimum of four courses of 12 Credits relevant to the area of research and offered under any approved PG programme of the University shall be recommended by the Doctoral Committee. But the scholars shall not have undergone such courses in their PG programme.
- 13.1.3 A Research Methodology paper is compulsory. Separate common syllabus for science & Engineering faculty given in the University website shall be followed. There shall be one special elective course

and the scholar has to attend regular classes for minimum two subjects along with PG students.

- 13.1.4 Only courses registered after the first Doctoral Committee meeting shall be counted towards this requirement. Any courses already passed by the scholar prior to provisional registration shall not be counted for this purpose.
- 13.1.5 No change in the course works prescribed shall be made without the approval of the Doctoral Committee.
- 13.1.6 The prescribed course works shall normally be completed within one year from the date of provisional registration in the case of Full-time scholar and two years in the case of Part-time scholar. If the scholar fails to complete the courses in time, appropriate action (including cancellation of registration) shall be taken by the Director (Research).
- 13.1.7 Regularly offered PG electives shall not be taken as Special Elective and the scholar shall wait to undertake such course when it is offered to the PG students in the Department.
- 13.1.8 If any course, specific to the area of research has to be newly designed, then such course shall be formulated as a Special Elective and the course syllabus shall be designed by the Supervisor, recommended by the Doctoral Committee and shall be approved in the Board of Study of the concerned Faculty and Academic Council. These courses shall be of PG level. A scholar shall be permitted to undertake **only one such Special Elective**.
- 13.1.9 Scholars with M.Phil. Degree in the Faculty of Science and Humanities shall be exempted two course works, provided the M.Phil. Degree is related to the proposed Ph.D. research work and if duly recommended by the Doctoral Committee.

13.1.10 The scholars shall secure a **CGPA of 6.0 in the course works** in order to become eligible for comprehension examination. The Scholar who fails to secure a CGPA of 6.0, he/she shall undertake one more course work relevant to the area of research offered under any approved PG programme of the University with the recommendation of the Doctoral Committee or rewrite the examination from any one of the course works (other than the Special Elective) undertaken. A pass in the Comprehensive Examination is required for provisional confirmation of Ph.D. registration.

### **13.2. Comprehensive Examination**

13.2.1 On the successful completion of the prescribed course works, as evidenced by the grade sheet issued by the Controller of Examinations, the Doctoral Committee shall conduct a Comprehensive (written and oral) Examination for every scholar to test the background knowledge of the scholar in the broad area of specialization. The Comprehensive Examination shall cover the topics in the specialization and allied areas. The result of this examination and the results of the course works shall be detailed in the minutes of the Doctoral Committee and forwarded to the Director (Research), for confirmation of the provisional registration and to proceed further with his/her research work, within two months from the date of the Comprehensive Examination held.

13.2.2 If the performance of the scholar is not approved by the Doctoral Committee based on the results of Comprehension Examination, a grace period of six months shall be given and then at the end of which the scholar shall be re-examined. If found fit, the scholar is provisionally confirmed and shall be permitted to proceed with his/her research work. Otherwise the provisional registration granted to the scholar shall be cancelled.

#### **14. RESEARCH OUTSIDE THE UNIVERSITY**

- 14.1 During the course of the Programme, for reasons stated by the Supervisor and forwarded by the Head of the Department, a scholar shall be permitted by the Director (Research) to spend upto one year in an Institution or in a project approved for the purpose, outside the University for carrying out research related to his/her area.
- 14.2 The scholars shall be permitted to do research outside the University on related fellowship programmes for a period upto one year, with prior approval from the Director (Research).
- 14.3 Under valid reasons, a scholar shall be permitted to continue his/her research outside the University upto six months beyond one year, with prior approval from the Vice-Chancellor.
- 14.4 The scholars who carried out research outside the University shall submit the Synopsis only after a minimum period of one month on his/her return.

#### **15. MONITORING THE PROGRESS OF THE SCHOLARS**

- 15.1 At the end of every semester, commencing from the date of provisional Registration, the scholar shall submit the progress report and registration renewal form in the prescribed format duly signed by the Supervisor and Head of the Department of the Supervisor during the payment of semester fee.
- 15.2 Two seminar presentations prior to the submission of Synopsis should be given by the research scholar, which is open to faculty members and scholars.

#### **16. CANCELLATION OF REGISTRATION**

- 16.1 The registration of a scholar who has exceeded the maximum

period stipulated for the programme as in Clause 11.1 shall stand cancelled automatically.

- 16.2 The registration is liable for cancellation administratively by the Director (Research), if
- i. The scholar has not paid the semester fees within the stipulated time.
  - ii. Two consecutive six month progress reports are not submitted or not satisfactory.
  - iii. The performance is not satisfactory to the Doctoral Committee and accordingly recommended for cancellation.
  - iv. The scholar wishes to withdraw the programme and requests to cancel his/her registration.
  - v. Extension of time (beyond six years) for six months at a time not obtained as in Clause 11.2.
  - vi. Submission of Thesis beyond six months from the date of approval of Synopsis by the Doctoral Committee.
  - vii. The act of plagiarism involved in the Thesis.
  - viii. Contact of Thesis examiners by the scholar regarding Thesis evaluation.
  - ix. Any violation of the rules and regulations of Ph.D. Programme.
- 16.3 In all the above cancellation cases, the fees paid by the scholar shall not be refunded.

## **17. SYNOPSIS OF THE THESIS**

- 17.1 The scholar shall be permitted to submit the Synopsis only after obtaining the confirmation of provisional registration and completion of the minimum duration of the programme applicable to the scholar. However, a scholar shall be permitted to submit the Synopsis (after

obtaining confirmation) three months prior to the completion of his/her minimum duration, provided the scholar has published two papers in referred journals after joining the programme and specifically recommended by the Doctoral Committee.

- 17.2 The Synopsis shall be accepted only when the scholar has published/accepted for publication without correction, atleast one paper in a referred impact factor journal or one patent approved.
- 17.3 The scholar shall submit a copy of the Synopsis of his/her research work prepared in accordance with the format and specification prescribed, to the Doctoral Committee through the Supervisor and Joint Supervisor, if applicable.
- 17.4 If the Doctoral Committee approves the research work reported in the Synopsis and fulfils Clause 15.2, it shall forward six copies of the approved Synopsis to the Director (Research) along with a panel of atleast eight examiners who are experts in the field of research of the scholar, four from India (Other than the Parent University & affiliated Colleges, atleast two from other states) and four from abroad, along with their publication details in the last five years. No two experts shall be from the same Institution.

## **18. READMISSION / DISCONTINUATION**

- 18.1. The Centre for Research, has proposed to collect fine form the Scholars for late payment of Semester Fees in the following manner. Rs.300/- if paid within 10 days after the last date, Rs.500/- if paid within 30 days after the last date, else the registration will be cancelled automatically. The research scholar should pay fee Rs.1000/- towards re-admission fee and the re-admission of such research scholar will be considered only based on the recommendation of the supervisor and approved by the Director - Research.

- 18.2. Readmission cannot be done after the period mentioned above.
- 18.3. If the scholar wishes to discontinue from the programme, Consent from the supervisor to be obtained and communicated to the Research Office.

**19. SUBMISSION OF THESIS**

- 19.1 The Thesis shall report, in an organized and scholarly fashion, an account of original research work of the scholar leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented, etc.) and demonstrating a quality contribution to the advancement of knowledge as well as the scholar's ability to undertake sustained research.
- 19.2 Three copies of Thesis shall be prepared in accordance with the format and specification prescribed. Thesis shall be submitted within three months from the date of approval of the Synopsis by the Doctoral Committee along with one copy of the abstract of the Thesis each in English and Tamil (in about 400 words). Under extraordinary circumstances, submission of Thesis shall be permitted upto a maximum period of six months, with prior approval from the Director (Research). In such cases, the late fee shall be paid as applicable.
- 19.3 The Thesis shall include a Certificate from the Supervisor and Joint Supervisor if applicable as prescribed, to the effect that the Thesis is a record of the bonafide research work carried out by the scholar under his/her supervision and that the work reported in the Thesis has not been submitted elsewhere for a degree or diploma.
- 19.4 The Thesis shall be scrutinized by a Scrutiny Committee constituted by the Vice-Chancellor to assess the overall layout, contents and the quality of presentation of the Thesis. The deviation, if any, shall be rectified by the scholar in consultation with the Supervisor and the same shall be approved by the Director (Research).

19.5 Fees shall be paid by the scholars for every semester during the notified period till the submission of the Thesis.

## **20. THESIS EVALUATION**

20.1 The Thesis shall be referred to two examiners (one from India and another from abroad) nominated by the Vice-Chancellor from the panel of examiners recommended by the Doctoral Committee. The Vice-Chancellor, if deems it necessary, may also nominate the examiners from outside the panel.

20.2 The Director (Research) shall take appropriate steps to receive the reports from the examiners as quickly as possible.

20.3 The examiners shall send his/her willingness to evaluate the Thesis within one month from the date of receipt of the Synopsis.

20.4 The examiners shall send his/her evaluation report in the prescribed format within two months from the date of receipt of the Thesis.

20.5 The examiner shall include in his/her report an overall assessment placing the Thesis in any one of the following categories.

20.5.1 Recommend the acceptance of the Thesis in the present form and further based on the standard attained, classify the work as HIGHLY COMMENDED/ COMMENDED.

20.5.2 Recommend the acceptance of the Thesis. However, the scholar shall incorporate the corrections indicated in the detailed report and place the corrected copy to the Oral Examination Board but the corrected Thesis need not be sent to the examiner.

20.5.3 Defer the recommendation at this stage and the scholar shall incorporate the suggested modifications in the Thesis and the corrected Thesis along with the scholar's clarifications shall be sent to the respective examiner.

- 20.5.4 Reject the Thesis for the reasons set out in the detailed report.
- 20.5.5 The examiner shall also enclose a detailed report in about 200 to 300 words, indicating the standard attained in the case of 20.5.1, the nature of revision in the case of 20.5.2 & 20.5.3 and specific reasons in the case of 20.5.4.
- 20.6 If both the examiners recommended for the award of the degree, Thesis shall be provisionally accepted. Any minor revision, modification, etc., suggested by the examiners shall be carried out before the Oral Examination Board.
- 20.6.1 If any examiner recommends revision in the Thesis, the scholar shall be permitted only once to revise and resubmit the Thesis within six months, and the revised Thesis shall be referred to the same examiner only in the situation such as
- i. When the examiner recommends new experiments and major modification involving new methodology.
  - ii. The examiner insists the University to send the Thesis back to the same examiner after revision for offering his/her final recommendation on the Thesis which shall be only either for recommendation for the award or for rejection.
- 20.6.2 If one examiner recommends the award of the degree while the other recommends rejection, then the Thesis shall be referred to the third examiner to be nominated by the Vice-Chancellor as in Clause 20.1. If two of the three examiners recommend the award, the Thesis shall be provisionally accepted. If two of the examiners recommend rejection, the Thesis shall be rejected and the registration of the scholar shall stand cancelled.
- 20.6.3 If both the examiners recommend rejection, the Thesis shall be rejected and the registration of the scholar shall stand cancelled.

20.7 In case, the examiner does not insist to send the Thesis back to him/her, the Thesis shall be referred to the Doctoral Committee to ascertain the corrections carried out in the Thesis as suggested by the examiners.

20.8 Individual cases not covered by the above Clauses shall be referred to the Vice-Chancellor. If deems fit, the Vice-Chancellor shall refer to the Board of Research which in turn shall refer to the Syndicate, for necessary action.

**21. ORAL EXAMINATION**

21.1 On receipt of the evaluation reports, the Doctoral Committee shall meet **within three months** and recommend a panel of three experts (Other than the Parent Institution) from different recognized institutions within India, along with their publication details in the last five years for constitution of an Oral Examination Board. No two experts shall be from the same Institution. The Vice-Chancellor nominates one member from the panel of experts recommended by the Doctoral Committee. The Vice-Chancellor, if deems it necessary, may nominate a member from outside the panel.

21.2 The Oral Examination Board shall be constituted by the Vice-Chancellor as follows:

a. Indian Examiner of the thesis or an expert from the panel (in the absence of the former)	Member
b. An expert from a recognized institution from the panel	Member
c. Supervisor of the scholar	Convener
d. Joint Supervisor of the scholar, if applicable	Member

- 21.3 The Oral examination shall be conducted **within three months** as “Open Defence Type” Examination. The circular for the same shall be communicated to the Director (Research) / faculty members / research scholars/other departments/ other Institutions, atleast one week prior to the Viva – Voce Examination. A minimum of ten members excluding Oral Examination Board members shall be present for the Viva-Voce Examination.
- 21.4 Viva-Voce Examination shall be held at the place of work of the Supervisor. If the Supervisor migrates to other University or non-recognized Organization/Department of the University or College not affiliated to the University, then the Viva - Voce Examination shall be held in the Department of the Supervisor where the scholar had provisionally registered for the programme.
- 21.5 If the Oral Examination Board reports the performance of the scholar as “not satisfactory” then he/she may opt to reappear for the Oral Examination at a later date (not later than six months from the date of the first Oral Examination). On the second occasion, the Oral Examination Board shall include one more expert nominated by the Vice-Chancellor.
- 21.6 If the performance of the scholar in the Oral Examination in the second occasion also reported to be “not satisfactory”, the Vice-Chancellor, if deems it necessary, shall refer the remarks of the Oral Examination Board, along with the Thesis and comments of the Examiners, to a Committee constituted for this purpose and the decision of the Vice-Chancellor shall be final.
- 21.7 On satisfactory completion of the Viva-Voce Examination, the scholar shall submit the corrected Thesis in A5 size in accordance with the format and specification prescribed, duly certified by the Supervisor

and Joint Supervisor, if applicable, that all the corrections have been incorporated in the Thesis as suggested by the examiners, along with two soft copies of the Thesis in CD, for University archives.

**22. AWARD OF Ph.D. DEGREE**

If the report of the Oral Examination Board is SATISFACTORY, the scholar shall be awarded Ph.D. Degree with the approval of the Syndicate. The Faculty for the award of Ph.D. Degree shall normally be based on the PG qualification of the scholar.

**23. PUBLICATION OF THESIS**

Papers arising out of the Thesis may be published by the scholar and the Supervisor. However the Thesis as a whole shall be published by the scholar/Supervisor with prior approval of the Vice-Chancellor.

**24. THE ACT OF PLAGIARISM**

24.1 In the case of scholars who have committed the act of plagiarism, his / her Thesis / degree shall be forfeited and his / her research registration shall be cancelled and also he/she shall be debarred to register for any other programme in the University.

24.2 For the abetment of above such action, the recognition of his/her Supervisorship shall be withdrawn for a period of five years and he/she shall be debarred from guiding the scholars for any research programme in the University till such period.

**25. POWER TO MODIFY**

Notwithstanding all that has been stated above, the Syndicate has the right to modify any of the above regulation from time to time.

**Note:** The scholar shall be governed by the regulations as in force from time to time. The Supervisors and scholars are requested to visit the website of Anna University of Technology, Coimbatore, <http://www.annauniv.ac.in> for updates and announcements periodically. The Supervisors and scholars can check the status of Synopsis / Thesis process from the following link by entering the registration number of the scholar.

<http://www.annauniv.ac.in>

**MANUAL FOR THE PREPARATION OF SYNOPSIS**  
**(Prescribed Format and Specification)**

**1. GENERAL:**

In general, the synopsis shall report, a brief explanation of original research work of the research scholar leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented etc).

**2. NUMBER OF COPIES TO BE SUBMITTED FOR EVALUATION :**

Synopsis : Six copies are to be submitted to the University.

**3. SIZE OF SYNOPSIS:**

The size of synopsis should not exceed 15 pages of typed matter reckoned from the first page to the last page.

**4. FORMAT OF SYNOPSIS:**

1. The synopsis may contain a cover page and a title page as per the specimen copy given in Annexure 1.
2. The table of contents should give details of the chapters enclosed and basic references utilized for carrying out the research work. One and a half spacing should be adopted for typing the matter under this head.
3. The Synopsis should have the following page margins
  - Top edge : 30 to 35 mm
  - Bottom edge : 25 to 30 mm
  - Left side : 35 to 40 mm
  - Right side : 20 to 25 mm
4. The Chapters may be typed in Times New Roman Font Size 13.
5. Required Headings, Sub Headings, Figure, Captions, and Table Captions can be included.

**ANNEXURE I**

(A typical Specimen of Cover Page & Title Page)

<Font Style Times New Roman - Bold>

**CERTAIN INVESTIGATIONS ON THE STABILITY OF LINEAR  
TIME INVARIANT SYSTEMS**

<Font Size 18> <1.5 line spacing>

**A SYNOPSIS**

<Font Size 14>

*Submitted by*

<Font Size 14> <Italic>

**SIVA M**

<Font Size 16>

*in partial fulfillment for the award of the degree  
of*

<Font Size 14> Italic<1.5 line spacing>

**DOCTOR OF PHILOSOPHY**

<Font Size 16>



**FACULTY OF ELECTRICAL ENGINEERING  
ANNA UNIVERSITY OF TECHNOLOGY,  
COIMBATORE - 641 047**

<Font Size 16> <1.5 line spacing>

**JANUARY 2010**

<Font Size 14>

**CERTAIN INVESTIGATIONS ON THE STABILITY OF  
LINEAR TIME INVARIANT SYSTEMS**

**A SYNOPSIS**

*Submitted by*

**SIVA M**



*in partial fulfillment for the award of the degree*

*of*

**DOCTOR OF PHILOSOPHY**

**FACULTY OF ELECTRICAL ENGINEERING  
ANNA UNIVERSITY OF TECHNOLOGY  
COIMBATORE 641 047**

**JANUARY 2010**

**ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE  
COIMBATORE – 641 047**

**MANUAL FOR PREPARATION OF Ph.D. THESIS  
(Prescribed Format and Specification)**

**1 GENERAL:**

The manual is intended to provide broad guidelines to the research Scholars in the preparation of the thesis. In general, the thesis shall report, in an organized and scholarly fashion, an account of original research work of the research scholar leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented, etc) and demonstrating a quality as to make a definite contribution to the advancement of knowledge and the research scholar's ability to undertake sustained research and present the findings in an appropriate manner with actual accomplishments of the work plainly stated and honestly appraised.

**2 NUMBER OF COPIES TO BE SUBMITTED FOR EVALUATION:**

Ph.D. Thesis : Three copies are to be submitted to the University.

**3 SIZE OF THESIS:**

The size of thesis should not exceed 300 pages of typed matter reckoned from the first page of Chapter 1 to the last page of the Appendix.

**4 ARRANGEMENT OF CONTENTS OF THESIS:**

The sequence in which the thesis material should be arranged and bound should be as follows:

1. Cover Page & Title page (as shown in Annexure II)
2. Bonafide Certificate (as shown in Annexure III)
3. Abstract

4. Acknowledgement
5. Table of Content (as shown in Annexure IV)
6. List of Tables
7. List of Figures
8. List of Symbols, Abbreviations and Nomenclature
9. Chapters
10. Appendices
11. References
12. List of Publications
13. Curriculum Vitae

The Tables and Figures shall be introduced in the appropriate places in the text of the thesis.

#### **5 PAGE DIMENSIONS AND MARGIN:**

The dimensions of the final bound 3 copies of the thesis report should be 290mm x 205mm. Standard A4 size (297mm x 210mm) paper may be used for preparing the copies.

The Thesis (at the time of submission) should have the following page margins :

Top edge	:	30 to 35 mm
Bottom edge	:	25 to 30 mm
Left side	:	35 to 40 mm
Right side	:	20 to 25 mm

The thesis should be bound with black calico cloth and using flexible cover of thick white art paper.

Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

## **6. MANUSCRIPT PREPARATION:**

In the preparation of the manuscript, care should be taken to ensure that all textual matter is typewritten to the extent possible in the same format as may be required for the final thesis. Hence some of the information required for the final typing of the thesis is included also in this section.

The headings of all items 2 to 12 listed in section 4 should be typed in capital letters without punctuation and centered 35 mm below the top of the page. The text should commence 2 spaces below this heading. The page numbering for all items from 1 to 8 should be done using lower case Roman numerals and the pages thereafter should be numbered using Arabic numerals.

**6.1 Cover Page & Title Page** A specimen copy of the Cover page & Title page for thesis is given in Annexure II.

**6.2 Bonafide Certificate** – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman Font Size 13, as per the format shown in Annexure III.

The certificate shall carry the research scholar's signature and supervisor's signature and shall be followed by the supervisor's name, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the research scholar. The term '**SUPERVISOR**' must be typed in capital letters between the supervisor's name and academic designation. Signature of the joint supervisor with details specified as above should be included wherever it is applicable.

**6.3 Abstract** - Abstract should be an essay type of narration not exceeding four pages outlining the research problem, the methodology used for

tackling it and a summary of the findings. This shall be typed in double line spacing using Font Style Times New Roman and Font Size 13.

- 6.4 Acknowledgement** – The acknowledgement shall be brief and should not exceed one page when typed in double spacing. The scholar's signature shall be made at the bottom right end above his/her name typed in capitals.
- 6.5 Table of contents** - The table of contents should list all material following it as well as any material which precedes it. The title page, Bonafide Certificate and Acknowledgment will not find a place among the items listed in the Table of Contents but the page numbers in lower case Roman letters are to be accounted for them. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table Contents for thesis is given in Annexure IV.
- 6.6 List of Table** - The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.
- 6.7 List of Figures** - The list should use exactly the same captions as they appear below the Figures in the text. One and a half spacing should be adopted for typing the matter under this head.
- 6.8 List of Symbols, Abbreviations** - One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used. The list should be arranged alphabetically with respect to contents on the right side.
- 6.9 Chapters** - The chapters may be broadly divided into 3 parts (i) Introductory chapter, (ii) Chapters developing the main theme of the thesis, (iii) Results, Discussion and Conclusion.

The main text shall be divided into several chapters and each chapter may be further divided into several divisions and sub divisions.

- \* Each chapter should be given an appropriate title.
- \* Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- \* Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

**6.10 Appendices** - Appendices are provided to give supplementary information, which if included in the main text may serve as a distraction and cloud the central theme under discussion.

- \* Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc.
- \* Appendices, Tables and references appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.
- \* Appendices shall carry the title of the work reported and the same title shall be included in the contents page also.
- \* The list of publications made by research scholar during the period of research, shall be brought in the Appendix titled, as List of Publications and the same shall be reported in the Table of contents.

**6.11 List of References** Any works of other researchers, if used either directly or indirectly, the origin of the material thus referred to at appropriate places in the thesis should be indicated. The authors publications during the period of research should not be included in the references. A paper, a monograph or a book may be designated

by the name of the first author followed by the year of publication, placed inside brackets at the appropriate places in the thesis. The citation may assume any one of the following forms.

### **Examples of citation**

- \* An improved algorithm has been adopted in literature (Natarajan 1990)
- \* Jhon and Mckay (1999) have dealt at length this principle.
- \* The problem of mechanical manipulators has been studied by Shin *et al.* (1984) and certain limitations of the method used, has been pointed out by Shin *et al.* (1984a).

The listing should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing left justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details. A typical illustrative list given below relates to the citation example quoted above.

### **REFERENCES**

1. Kannadasan, T. and Gopalakrishnan, K. "Issues and Challenges of Academic Research in India", Journal of IPE, Manufacturing Technology and Management, Vol.3, No.2, pp.131-138, 2009.
2. Devadasan, S.R. "Study of Various Quality Models in Engineering Educational Institutions", Proceedings of the International Conference: TEAM TECH 2007, IISc, Bangalore, India, October 4-6, pp.115-122, 2007.
3. Verdu, S. Multiuser Detection, Cambridge University Press, New York, 2008.
4. Massey, J.L. and Mittelhlizer, T. "Welch's bound and sequence sets

for code-division multiple-access systems” in sequence II, Methods in Communication, Security and Computer Sciences, R. Capocelli, A. De Santis and U. Vaccaro, Eds. Springer-Verlag, New York, 2007.

**6.12 Curriculum Vitae** – A Vitae mentioning the salient potentialities of the author shall be made at the end of the Thesis.

The Vitae shall be prepared in double spacing and shall be restricted to a single page.

**6.13 Tables and Figures** - By the word Table, is meant tabulated numerical data in the body of the thesis as well as in the appendices. All other non verbal material used in the body of the thesis and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

- \* A table or figure including caption should be accommodated within the prescribed margin limits and appear on the page following the page where their first reference is made.
- \* Tables and Figures on half page or less in length may appear on the same page along with the text. However, they should be separated from the text both above and below by triple spacing.
- \* All Tables and Figures should be prepared on the same paper or material used for the preparation of the rest of the Thesis.
- \* Two or more small Tables or Figures may be grouped if necessary in a single page.
- \* Wherever possible, the entire photograph(s) may be reproduced on a full sheet of photographic paper.

- \* Photographs if any should be included in the colour Xerox form only. More than one photograph can be included in a page.
- \* Samples of Fabric, Leather, etc., if absolutely necessary may be attached evenly in a page and fixed/pasted suitably and should be treated as figures.

## **7 TYPING INSTRUCTIONS**

### **7.1 General**

This section includes additional information for final typing of the thesis. Some information given earlier under 'Manuscript preparation' shall also be referred.

The impressions on the typed/duplicated/printed copies should be black in colour.

If Computer printers are used uniformity of the font in the thesis shall be observed.

A sub-heading at the bottom of a page must have at least two full lines below it or else it should be carried over to the next page.

The last word of any page should not be split using a hyphen.

One and a half spacing should be used for typing the general text. The general text shall be typed in Font Style Times New Roman and Font Size 13. Single spacing should be used for typing:

- (i) Long Tables
- (ii) Long quotations
- (iii) Foot notes
- (iv) Multilane captions
- (v) References

All quotations exceeding one line should be typed in an indented space- the indentation being 15mm from either side of the margin.

## **7.2 Chapters**

The format for typing Chapter headings, Divisions headings and Sub-division headings are explained through the following illustrative examples.

Chapter heading : CHAPTER 1

### **INTRODUCTION**

Division heading : 1.1 OUTLINE OF THESIS

Sub division heading : 1.1.1 Literature review.

1.1.1.1 Waste Water characteristics.

The word CHAPTER without punctuation should be centred 50mm down from the top of the page. Two spaces below, the title of the chapter should be typed centrally in capital letters. The text should commence 4 spaces below this title, the first letter of the text starting 20mm, inside from the left hand margin.

The division and sub division captions along with their numberings should be left justified. The typed material directly below division or sub division heading should commence 2 spaces below it and should be offset 20mm from the left hand margin. Within a division or sub division, paragraphs are permitted. Even paragraph should commence 3 spaces below the last line of the preceding paragraph, the first letter in the paragraph being offset from the left hand margin by 20 mm.

## **8. NUMBERING INSTRUCTIONS**

### **8.1 Page Numbering**

All pages numbers (whether it be in Roman or Arabic numbers) should be typed without punctuation on the upper right hand corner 20mm from the top with the last digit in line with the right hand margin. The preliminary pages

of the thesis (such as Title page, Acknowledgement, Table of Contents etc.) should be numbered in lower case Roman numerals. The title page will be numbered as (i) but this should not be typed. The page immediately following the title page shall be numbered as (ii) and it should appear at the top right hand corner as already specified. Pages of main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals.

## **8.2 Numbering of Chapters, Divisions and Sub Divisions**

The numbering of chapters, divisions and sub divisions should be done using Arabic numerals only and further decimal notation should be used for numbering the divisions and sub divisions within a chapter. For example sub division 4 under division 3 belonging to chapter 2 should be numbered as 2.3.4. The caption for the sub division should immediately follow the number assigned to it.

Every chapter beginning with the first chapter should be serially numbered using Arabic numerals. Appendices, included if any ,should also be numbered in an identical manner starting with Appendix 1.

## **8.3 Numbering of Tables and Figures**

Tables and Figures appearing anywhere in the Thesis should bear appropriate numbers. The rule for assigning such numbers is illustrated through an example. Thus, if a Figure in Chapter 3, happens to be the fourth then assign 3.4 to that Figure. Identical rules apply for tables except that the word Figure is replaced by the word Table. If Figures (or Tables) appear in appendices then Figure 3 in Appendix 2 will be designated as Figure A 2.3. If a Table to be continued into the next page this may be done, but no line should be drawn underneath an unfinished table. The top line of the table continued into the next page should, for example read Table 2.1 (continued) placed centrally and underlined.

#### 8.4 Numbering of Equations

Equations appearing in each Chapter or Appendix should be numbered serially, the numbering commencing afresh for each Chapter or Appendix. Thus for example, an equation appearing in Chapter 2, if it happens to be the eighth equation in that Chapter should be numbered (2.8) thus:

$$\frac{C(s)}{R(s)} = \frac{G_1 G_2}{1 + G_1 G_2 H} \quad (2.8)$$

While referring to this equation in the body of the Thesis it should be referred to as Equation (2.8).

### 9. BINDING SPECIFICATIONS

- \* Thesis (3 copies) should be bound using flexible cover of thick white art paper. The spine for the bound volume should be of black Calico of 20mm width. The cover should be printed in black letters and the text for printing should be identical to what has been prescribed for the title page.
- \* A copy of the Ph.D. thesis should be reduced to A5 size with printing on both sides with hard bound binding in white colour and submitted after the viva-voce examination duly certified by the supervisor that all the corrections suggested by the examiners have been carried out. The recommendations of the Viva Board Examiners should be placed between the Title Page and Bonafide Certificate on binding.
- \* One copy of the Ph.D. thesis should be submitted in CD after the viva-voce examination is completed along with the A5 hard copy of the thesis.

**ANNEXURE II**

(A typical Specimen of Cover Page and Title Page)  
<Font Style Times New Roman - Bold>

**CERTAIN INVESTIGATIONS ON THE STABILITY OF  
LINEAR TIME INVARIANT SYSTEMS**

<Font Size 18> <1.5 line spacing>

**A THESIS**

<Font Size 14>

*Submitted by*

<Font Size 14> <Italic>

**SIVA M**

<Font Size 16>

*in partial fulfillment for the award of the degree  
of*

<Font Size 14> <1.5 line spacing>

**DOCTOR OF PHILOSOPHY**

<Font Size 16>



**FACULTY OF ELECTRICAL ENGINEERING  
ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE  
COIMBATORE-641 047**

<Font Size 16><1.5 line spacing>

**JANUARY 2010**

<Font Size 14>

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LINEAR TIME INVARIANT SYSTEMS**

**A THESIS**

***Submitted by***

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***of***

**DOCTOR OF PHILOSOPHY**



**FACULTY OF ELECTRICAL ENGINEERING  
ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE**

**COIMBATORE-641 047**

**JANUARY 2010**

**ANNEXURE III**

(A typical Specimen of Bonafide Certificate)

<Font Style Times New Roman >

**ANNA UNIVERSITY OF TECHNOLOGY,COIMBATORE 641 047**

<Font Style Times New Roman – Size - 18>

**BONAFIDE CERTIFICATE**

<Font Style Times New Roman – Size - 16>

<Font Style Times New Roman – Size - 14>

Certified that this thesis titled “**CERTAIN INVESTIGATIONS ON THE STABILITY OF LINEAR TIME INVARIANT SYSTEMS**” is the bonafide work of **Mr. SIVA .M** who carried out the research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion of this or any other candidate.

<<Signature of the Research Scholar>>

SIGNATURE

<<Signature of the Supervisor>>

SIGNATURE

<<Name>>

RESEARCH SCHOLAR

<<Name>>

SUPERVISOR

<<Academic Designation >>

<<Department>>

<<Full address of the College>>

## **ANNEXURE IV**

(A typical Specimen of Table of Contents)  
<Font Style Times New Roman, Font Size 14>

### **TABLE OF CONTENTS**

<b>CHAPTER NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
	<b>ABSTRACT</b>	<b>iii</b>
	<b>LIST OF TABLES</b>	<b>xvi</b>
	<b>LIST OF FIGURES</b>	<b>xviii</b>
	<b>LIST OF SYMBOLS, ABBREVIATIONS</b>	<b>xxvii</b>
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	GENERAL	1
1.2	USE OF INDUSTRIAL WASTE IN CONCRETE-MAKING	2
1.2.1	General	5
1.2.2	Beneficiation Ceramic Waste	12
1.2.3	Test on Ceramic Waste Coarse Aggregate	19
	1.2.3.1 General	25
	1.2.3.2 Beneficiation Ceramic Waste	29
	1.2.3.3 Test on Ceramic Waste Coarse Aggregate	33
1.3	SUSTAINABLE CONCRETE TECHNOLOGY	58
1.4	CERAMIC INDUSTRIAL WASTE AS COARSE AGGREGATE	69
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>100</b>
2.1	GENERAL	
2.2	ALTERNATE AGGREGATES	
2.3	RECYCLING	