F.No. 105(444)/DTU/Acad-UG/2017 /3604 – 10   Dated:- 01/5/19

NOTIFICATION

Sub: Introduction of Undergraduate Research Project and Mini Project, course in B. Tech Curriculum.

The Academic Council of DTU in its 19th meeting held on 16.11.2018 has approved the following DEC/GEC elective subjects:-

(i)   **Undergraduate Research Project** :- This elective will be offered in V semester. The student will be allowed to earn four (04) credits by publishing research paper in journals of repute as listed in the category of premier of commendable research notified by the university. This course may be registered by only those students who have secured at least 6 CGPA upto 4th semester. A group of maximum two (2) students can register for this elective at the beginning of 5th semester. The student shall work under the mentorship of a single faculty advisor who must have published at least 5 papers in SCI/SCI-expanded/SCOPUS indexed journals. In case a student wants to withdraw from this course then he/she will have to earn 04 credits by registering in an alternative departmental elective course. Further, if a student has not registered for this research course in 5th semester but is able to meet all other requirements for earning the credits from UG research project course the he/she may be allowed to replace his/her grade and credits earned from some other elective course with grade and credits earned from UG research project.
(Details of prerequisites, course registration and withdrawal procedure is attached as Appendix ~`A'

(ii)   **Mini Project** :- Mini project is an elective for UG students to enable them apply knowledge to address the real world situation/problems and find solution. The student will carry out this project under the supervision of a faculty advisor. A group of maximum two (02) students can register for this elective at the beginning of 5th semester. The registered students should submit a mini project proposal in the prescribed format enclosed in the office of HOD within 10 days of semester registration. The HOD should constitute an undergraduate research committee comprising of (i) Chairperson BOS (ii) Two faculty members nominated by HOD (ii) faculty advisor of the group to approve/reject proposals based on the merits and expected outcome of the project. The same committee may also assign the maximum possible grades for an approved project.

The students will be required to develop and present a working prototype at the end of the course to earn the credits of the course. If the students are not able to develop the working prototype, they will not be able to earn 4 credits and they will be have to repeat the course in the form of a new project/register in some other departmental elective course having equivalent credits.
(Details of registration, method of evaluation, award of grades etc is as Appendix ~`B'

(Prof. Madhusudan Singh)
Dean Academic (UG)

Enclosures : As above.

F.No. 105(444)/DTU/Acad-UG/2017/3604 – 10   **Dated:-** 01/5/19

<u>Copy to</u>

1. PS to the Vice-Chancellor for kind information to the Hon'ble Vice Chancellor.
2. PA to the PVC for kind information to the Pro Vice Chancellor, DTU.
3. Registrar,
4. All Deans.
5. All HoDs,
6. Controller of Examinations.
7. Head (CC): with the request to upload on Academic page of DTU website.

(Prof. Rajeshwari Pandey)
Associate Dean Academic (UG)

UNDERGRADUATE RESEARCH PAPER

Course objective: The idea of the course is to develop analytical skills and critical thinking among the students. The course will enable the student learn appropriate research methodologies and to use them. The course will enable the student to develop a new idea. Further it will allow the student to understand, apply, interpret and evaluate the research concepts. To summarize, the research experience at the undergraduate level will not only allow the student to learn content, but they will also learn how knowledge is constructed in a particular discipline. The aim of the course is to promote and recognize published research work at the undergraduate level. Hence, the outcome of the course will be a publication in a reputed journal.

1. COURSE CONTENT

The requirement of this course is to conduct original research. The ideas must be relevant, thoroughly analysed and empirically validated using quantitative, descriptive, correlational, comparative, quasi-theoretical, and experimental techniques.

It may comprise of creative and meticulous work undertaken to contribute to the state of knowledge, including knowledge of universal, biological, societal systems, and the use of valid stock of knowledge to devise new applications. It may be used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories.

The outcome of the research would be considered for the award of credits based upon a published work in the reputed journals as listed with in the duration of the curriculum.

The nomenclature of the course will be:

S. No	Paper Code	Paper Title	Credits	Semester	Type
1	xx 393 "xx" will be the departmental code	Research Work	4	Fifth	DEC

The meaning of the terms used in the description of this course will be as follows:

i.   **Paper:** Any publication appearing in journal entitled "......" excluding letters to the editor and the editorials. The publication must be electronically available online with DOI.
ii. **Faculty Advisor:** An individual who is a regular faculty of the Delhi Technological University and agrees to supervise/mentor the student in the research work.
iii. **University Student:** An individual who is registered for B.Tech degree in the Delhi Technological University.
iv. **DEC:** Department elective course

2. PREREQUISITES FOR COURSEREGISTRATION

The student must have obtained minimum 6[1] CGPA at the end of fourth semester. The faculty advisor must have at least 5[1] SCI/SCI-Expanded/Scopus publications.

3. COURSE DETAILS AND PUBLICATION ACCEPTANCE CRITERIA:

1) The course will be offered to the students in the 5th semester.
2) The students will be allowed to earn 4 credits by publishing paper in the third and/or fourth year of B.Tech program provided:
   - The research work is published in one of the journals listed in the category of premier or commendable research as detailed in point 4;
   - Faculty advisor is co-author and the number of student authors is not more than two. Further, there cannot be any other co-author from outside /inside the university apart from faculty advisor in the publication.

4. CATEGORIES OF PUBLICATION:

The publication made in the journals, which seeks publication fee (article processing charges or open access charges), shall not be considered for irrespective of the listing in the publication societies/ houses/ presses specified in the following lists.

Category A) Premier Research Publications

The research publication must be in a journal of impact factor at least one, indexed in SCI or SCI expanded and published in the following:

1. Proceedings of Royal Society
2. American Mathematical Society
3. American Physical Society
4. American Society for Civil Engineers (ASCE)
5. American Society for Mechanical Engineers (ASME)
6. IEEE Transactions
7. Association for Computing Machinery (ACM) Transactions
8. Institute of Civil Engineering Publishing, London
9. Institute of Mechanical Engineering, London
10. American Society of Testing Materials (ASTM)
11. Nature Publishing Group

In addition to the above list, the journals with impact factor equal to or more than thirty (30) will be also be considered.

Category B) Commendable Research Publications

The research publication must be in a journal of impact factor at least one, indexed in SCI or SCI expanded and published in the following:

1. IEEE Journals
2. Springer
3. Elsevier (Science Direct)
4. Oxford University Press

---

[1]In case of a student extremely willing to pursue this course the prerequisites can be waived with the recommendation of HOD/Dean IRD by the Vice Chancellor

5. Pergamon-Elsevier Science Ltd
6. Cambridge University Press
7. Wiley-Blackwell
8. Blackwell Publishing
9. John Wiley & Sons
10. Institute of Engineering and Technology (IET)
11. Biomedical Central Ltd
12. MIT Press
13. Indiana University Press
14. American Meteorological Society
15. American Physiological Society
16. American Society for Microbiology
17. American Chemical Society
18. American Institute of Physics
19. IOP Publishing Ltd.
20. Massachusetts Medical Society
21. IOS Press
22. Princeton University Press
23. Society of Industrial and Applied Mathematics
24. Proceedings of National Academy of Sciences of USA

In addition to the above list, SCI and SCI expanded indexed journal not included in the above list having impact factor equal to or more than five shall also be considered.

——— X ———

5. PROCESS OF REGISTRATION AND AWARD OF GRADES

A. The student will be required to register for the course in the beginning of the fifth semester along with the name of the faculty advisor and consent letter from the faculty advisor.

B. The credits can be earned by the student in subsequent semester (VI-VIII) when the student provides evidence, through faculty advisor and HOD, of the online publication of the research paper. For, instance, if the student provides evidence of the online publication in semester 5th, 4 credits will be awarded to the student in semester 6th. However, in case the publication is made in the semester 8th, the student will be awarded credits in the same semester.

C. The following grades will be awarded to the students based on the category of the publication:

Publication Category	Grade
Premier Research category	O
Commendable Research category	A+

D. In case a student wants to withdraw from this course then he will have to earn 04 credits by registering in an alternative departmental elective course.

E. If a student has not registered for this research course in 5th semester but is able to meet all other requirements for earning the credits from UG research project course then he/she may be allowed to replace his grade and credits earned from some other elective course with grade and credits earned from UG research project.

— 90 —

Mini Project

Course Objective: The aim of the mini project is to enable the students apply knowledge to address the real-world situation/problem and find the solutions for them. The students will be required to produce and present a working prototype at the end of the course.

1. COURSE CONTENT

The requirements of this course is to design and develop a product which provides solution to a real-world situation/problem.

The outcome of the mini project would be considered for the award of credits based upon the development of a working prototype in the prescribed duration of the course.

The following isthe nomenclature of the course:

Paper Code	Paper Title	Credits	Semester	Type	Marks	
					MTE	ETE
XX 391 * "XX" is the departmental code	Mini Project	4	Fifth	DEC	40	60

2. COURSE REGISTRATION:

1) The course will be offered to the students in the 5th semester as part of departmental elective courses.
2) The duration of the course will be one year. The examination for the course will be conducted at the end of the 6th semester.
3) The maximum number of students in the team for mini project can be two.
4) The students will be required to prepare a title that relates to the engineering discipline and the topic MUST emulate a real-world situation/problem.
   a. An early proposal in prescribed format must be submitted describing the proposed idea and the expected output of the final productin the office of HOD within 10 days of registration.
   b. During the semester two progress reports of 3-4 pages must be submitted briefing on the current progress.
5) The mini project must be submitted to the department for evaluation through the faculty advisor at the end of the 6th semester. The report should be submitted with due approval of the faculty advisor and should be duly signed by the faculty advisor.
6) The layout of the final report of the mini project report may be:
   a. Title ("Final Report of xx391 Mini Project submitted by", name of students with roll numbers, "under the guidance of", name of faculty advisor, DTU Logo and, Delhi Technological University, Delhi, <Month name><Year>").
   b. Acknowledgement
   c. Table of Contents
   d. Introduction
   e. Product specifications/Software requirement specifications
   f. Design of the product (Methodology, structured chart, algorithm, pseudocode)
   g. System Manual
   h. Conclusion
   i. Future work

3. PROCEDURE OF CONDUCT AND EVALUATION OF MINI PROJECT:

1) This course will be offered in the 5th semester of the B. Tech. program and its total duration will be two semesters.

2) The student will require to register for the course in the beginning of the 5th semester along with the name of the faculty advisor and consent letter from the faculty advisor.

3) The evaluation will be based on two progress reports submitted in semester 5th and 6th and End-Term Examination (ETE) conducted at the end of 6th semester with the weightage of 40% and 60% respectively.

4) The mid semester examination will be held in each of the 5th and 6th semesters with a total weightage of 40%. The Mid-Term examination will involve report submission, presentation and oral viva-voce by the student to the faculty advisor. The evaluation will be based on understanding of the project, quantum and quality of work done and regularity of the student.

5) The end term mini project examination will be carried out at the end of 6th semester (for 4 credits)and, within 10 days from thelast theory paper. For this purpose, suitable examination committee will be appointed by the BoS, with at least one external examiner.

6) The students will be required to submit a final project report, after incorporating correction suggested by the project faculty advisor, with the signature of the faculty advisor, to the department, at least 3 days before the date of end semester mini project examination.

7) The final examination presentation may be in the form of demonstration of the product and viva-voce. The final evaluation will be based on the report quality, product demonstration, presentation and Q&A.

8) Absolute grading system will be used for the mini project.The Grade Moderation Committee for the course will be the same as that for other courses of the class.

9) In case a student is awarded a failing grade in the mini project, he/she shall have to repeat the course in the form of a new project/register in some other departmental elective course having equivalent credits.

10) Normal attendance regulations will not apply to this course.

MINI PROJECT PROPOSAL FORMAT

To be filled by student

Name	
Roll Number	
Department	
Proposed Project Title	
Name of proposed faculty advisor	
Aims of the Project	

i	Abstract and specific aims	A one paragraph summary of the project proposal and summary of the project goals.
ii	Introduction	Justification for the need of the proposed project, expected outcomes and its applications. (Approx. 01 page)
Iii	Project Design	Detailed description of the project design plan, methods and procedures to be used and description of final form of the product.(1 -2 pages)
iv	Project budget	Details of budgetary requirement and justification. (1-2 pages)
v	Project Timeline	Outline the anticipated dates of completion of various stages of the project
v	References	List of references

92

Group Rings

Paper Code: AM - SCSC

L	T	P
3	0	0

Unit I

Group ring as formal linear combinations, support of an element. Group Algebra, Augmentation ideal, Abelian group algebras, commutative subalgebras.

Unit II

Noetherian group, Chain conditions in group rings, Semisimplicity of group ring, Von Neumann regular group ring.

Unit III

Left and right ideals in a group ring, Nilpotent ideals, Nilpotent Augmentation ideal, Semiprime group rings, Prime group rings, Annihilator ideal.

Unit IV

Torsion free group, Idempotent elements, central idempotents, idempotent conjecture for group rings, Nilpotent elements.

Unit V

Unit group of a ring, units in group rings, central units, Trivial units, unit conjecture for group rings, zero divisors in group rings, Zero divisor conjecture. The Isomorphism problem.

References:

1. C.P. Milies and S.K. Sehgal, An Introduction to Group Rings, Kluwer Academic Publishers, 2002.
2. T.Y. Lam, A First Course in Noncommutative Rings, Springer, 2001.
3. D.S. Passman, The Algebraic structure of Group Rings, Wiley Interscience Publication, 2011.
4. D.S. Passman, Infinite Group Rings, Marcel Dekker Inc., 1971.

-93-