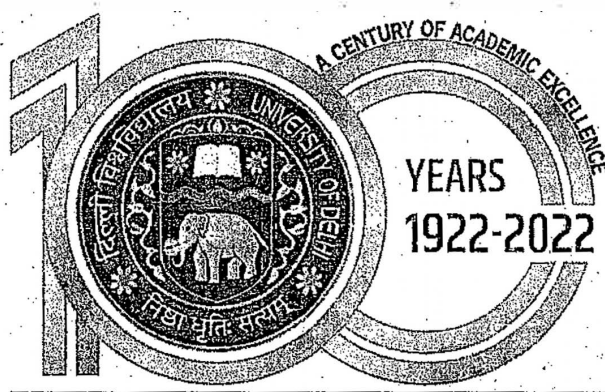


Appendix-70  
Resolution No. 14-1 (14-1-16)

**REPORT**  
**OF THE COMMITTEE**  
**ON THE FACULTY OF TECHNOLOGY**



**UNIVERSITY OF DELHI**

**REPORT OF THE COMMITTEE FOR INITIATION OF B.TECH.  
PROGRAMMES UNDER THE FACULTY OF TECHNOLOGY**

A committee was constituted by the Competent Authority vide Notification No. Acad.I/FOT/2021/01/893 dated 05.11.2021 to deliberate upon the following terms of reference in order to encourage holistic, multidisciplinary and interdisciplinary approach in higher education in line with central theme of National Education Policy-2020 leading to initiation of various programmes of study under the Faculty of Technology of the University.

The composition, terms of reference and initial recommendation of the committee was reported to the Academic Council vide Resolution No. 27 (27-11) dated 10.12.2021 and the Executive Council vide Resolution No. 42 (42-10) dated 17.12.2021. Prof. A.K. Tandon, Founder Director, BPIT, GGSIPU and formerly Professor and Head, EE Department, DCE (DTU) has been co-opted as an External Expert Member in the Committee with the approval of the Competent Authority.

**Composition of the committee:**

- |  |   |                        |
|--|---|------------------------|
| 1. Prof. D. S. Chauhan   | - | Chairperson            |
| Former Vice Chancellor, Uttar Pradesh Technical University and Uttrakhand Technical University |   |                        |
| 2. Prof. A.K. Tandon   | - | External Expert Member |
| Founder Director, BPIT, GGSIPU   |   |                        |
| Formerly Prof. and Head, EE Department, DCE (DTU)  |   |                        |
| 3. Dean, Faculty of Technology, DU   | - | Member                 |
| 4. Dean, Academic Activities & Projects, DU<br>(Re-nomenclatured as Dean, Academic Affairs)    | - | Member                 |
| 5. Dean, Faculty of Science, DU  | - | Member                 |
| 6. Dean, Faculty of Mathematical Sciences, DU  | - | Member                 |
| 7. Prof. Madhusudan Singh,   | - | External Expert Member |
| Dean Academics, Under Graduate Studies,  |   |                        |

Delhi Technological University

8. Prof. Rajeshwari Pandey, - External Expert Member  
Associate Dean Academics, Under Graduate Studies,  
Delhi Technological University
9. Joint Registrar, Academic, DU - Secretary

**Terms of reference of the Committee:**

1. Scope and feasibility of establishment of departments under Faculty of Technology
2. Structure of the departments
3. Areas of academic endeavour, the departments are required to accomplish
4. Structure and nomenclature of the courses of study, the departments would envisage to run
5. Requirement and qualification of the faculty members necessary to smoothly conduct teaching, learning and research in the departments
6. Any other matter relevant to this subject

The committee held several meetings in course of last more than one and half years and systematically deliberated upon various issues within its terms of reference to facilitate initiation of the three B.Tech programmes under the Faculty of Technology in the emerging subject areas of Computer Science and Engineering, Electronics and Communication Engineering and Electrical Engineering.

The meetings of the committee have been held on 18.11.2021, 25.01.2022, 05.04.2022, 22.07.2022 and 12.05.2023.

**Deliberations and recommendations of the committee in its meeting held on 12.05.2023 at 11:00 A.M.**

- At the outset, Chairman welcomed the members of the committee and requested the Joint Registrar (Academic) to highlight the further developments with respect to the deliberations held at the level of the University.
- Joint Registrar (Academic) informed the Committee about the approval received from the Ministry of Education vide letter No. 4-2/2022 CU-II dated 13.04.2023 for creation of teaching and non teaching posts for the Faculty of Technology of the University as per details provided below.
- Number of teaching and non teaching posts sanctioned by the Ministry of Education vide letter no. F.No. 4-2/2022 CU-II dated 13.04.2023

Sl No.	Name of Post	Level of Pay	No. of Post(s) Proposed	No. of Post(s) agreed	Remarks
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**Teaching Posts**

1.	Professor	L-14	08	08	
2.	Associate Professor	L-13A	16	16	
3.	Assistant Professor	L-10	48	48	
	TOTAL (a)		72	72	

**Non-Teaching Posts**

1.	Section Officer	L-7	03	02	
2.	Senior Assistant	L-6	03	02	
3.	Assistant	L-4	03	02	
4.	Junior Assistant	L-2	09	06	

5.	MTS	L-1	06	00	To be outsourced
6.	Senior Technical Assistant	L-6	06	03	01 for each course
7.	Technical Assistant	L-5	12	06	02 for each course
8.	Laboratory Assistant	L-4	18	12	04 for each course
9.	Laboratory Attendant	L-1	19	15	05 for each course
	<b>TOTAL (b)</b>		<b>79</b>	<b>48</b>	
<b>GRAND TOTAL (a+b)</b>			<b>151</b>	<b>120 (72+48)</b>	

- The committee noted the important development in terms of availability of posts which are essential for starting the following 03 B.Tech programmes under the Faculty of Technology with effect from the Academic Session 2023-24.

Department	B.Tech. programmes
Department of Computer Engineering	B.Tech. Computer Science and Engineering
Department of Electronics and Communication Engineering	B.Tech. Electronics and Communication Engineering
Department of Electrical Engineering	B.Tech. Electrical Engineering

- The committee deliberated upon the number of posts to be filled up in the first phase for initiation for the B.Tech programmes. In this context, the letter no. Acad.I/FOT/2022/R-4290 dated 16.02.2022 sent by the University to the Under Secretary, Department of Higher Education, Ministry of Education was discussed wherein the University has proposed to fill up 18 teaching posts in the 1<sup>st</sup> year of the programme with 03 posts of Professors, 03 posts of Associate Professors and 12 posts of Assistant Professors.
- The committee, after due deliberation, recommended that it would be appropriate to fill up 18 posts of Assistant Professors at the first instance. Other posts can be filled up subsequently depending upon operational requirement.
- The committee noted the minimum qualifications for direct recruitment for the posts of Assistant Professor (Academic Pay Level 10) as per the AICTE Notification dated 01.03.2019 by which AICTE Regulations, 2019 was notified.

- **Minimum Qualifications for direct recruitment as an Assistant Professor (Level – 10) as per AICTE norms**

**(a) Engineering / Technology**

B. E. / B. Tech. / B. S. and M. E. / M. Tech. / M. S. or Integrated M. Tech. in relevant branch with first class or equivalent in any one of the degrees.

**(b) Qualifications for Faculties in Science and Humanities:**

The qualifications for recruitment and promotions for faculty in the disciplines of Basic Sciences, Social Sciences and Humanities shall be as per the UGC Notification No. F.1-2/2017 (EC/PS) Dated 18<sup>th</sup> July, 2018 and UGC guidelines as adopted by the University of Delhi from time to time. Please refer to **Annexure IV** of the Report.

**Note:** Candidates who have done Ph.D. after the Bachelor's Degree from institution of National importance with GATE/GPAT/CEED shall be eligible for the post of Assistant Professor.

- The committee, after due deliberations, recommended that the qualifications prescribed by the AICTE or the UGC with respect to the disciplines covered by the UGC Regulations may be further expanded in scope in terms of inclusion of more diverse nature of degrees in the respective streams beyond what has been prescribed, depending upon operational requirement of running these B.Tech. courses while imparting state of the art knowledge dissemination in line with the emerging trends of technology education globally while upholding the basic tenets of the NEP 2020.
- The committee felt the requirement of restructuring the posts earmarked for the three departments of engineering i.e. Electrical Engineering, Computer Engineering and Electronics and Communication Engineering and allot a few posts for recruitment under the Department of Applied Sciences and Humanities which already exists under the Faculty of Technology of the

University vide Statute 9 B of the Statutes of the University as the subject areas of Mathematics, Physics, Environmental Science, Psychology, English, Communication Skills etc. falls under this Department.

- The committee recommended the following groups under the Department of Applied Sciences and Humanities for the purpose of recruitment of faculty members in the Department.

#### **GROUP I**

- Mathematics
- Applied Mathematics
- Mathematical Statistics
- Mathematics & Computing
- Mathematics & Computer Applications

#### **GROUP II**

- Physics
- Applied Physics
- Engineering Physics
- Electronics
- Electronic Science

#### **GROUP III**

- Environment Science
- Environment Engineering
- Civil Engineering



#### **GROUP IV**

- Psychology
  - Applied Psychology
  - Communication Skills
  - English
- The committee recommended to fill up the 18 posts of Assistant Professors in the first phase of recruitment in the following manner:

Designation	Department of Electrical Engineering	Department of Computer Engineering	Department of Electronics and Communication Engineering	Department of Applied Sciences and Humanities	Total
Assistant Professor	4	6	4	4*	18

\* The committee decided to fill up 04 posts of Assistant Professors, 02 each in Group I and Group II in the first phase.

- The committee also recommended the procedure for appointment of the Assistant Professors as detailed as **Annexure I** of the report.
- However, the committee authorized the Hon'ble Vice Chancellor to make amendments, wherever necessary, depending upon operational requirement and administrative convenience.

- The issue of the initiation of the 03 B.Tech Programmes in the first year in terms of modalities of admissions, student strength and other relevant parameters were also discussed in the meeting in all its ramifications. The committee recommended the following in this regard:

- **Mode of Admission to the B.Tech programmes :** The University will utilize the Joint Entrance Examination (Mains) score obtained by a student for admission to the B.Tech programmes.
- **Infrastructure requirment:** The committe was apprised that the proposal has already been submitted to the Ministry of Educaton for a building for the Faculty of Technology which will take time to be constructed on receipt of necessary financial and other statutory approvals.

In view of this, the committee recommended adequate arrangement for space may be done to accommodate the classrooms and laboratories which are essential for running the B.Tech programmes till the time the exclusive building for the Faculty of Technology is built and made operational.

The committee authorized the Hon'ble Vice Chancellor to decide upon the space and other essential physical infrastructure for initiation of these B.Tech programmes.

- As far as student strength in the 1st year is concerned, the committee noted the following:

Name of the programmes	Year	Number of Sections	Mode of teaching-learning	Total number of students intake in the first year of the Programmes
B.Tech, Computer Science & Engineering	1 <sup>st</sup> Year	02	Semester mode	120
B.Tech, Electronics and Communication Engineering	1 <sup>st</sup> Year	02	Semester mode	120
B.Tech, Electrical Engineering	1 <sup>st</sup> Year	02	Semester mode	120
Total intake				360*

\* It excludes usual supernumerary seats under various quota such as CW quota, ward quota, ECA quota, sports quota, orphan quota etc. as applicable for other programmes of study in the University from time to time.

- The committee took note of its earlier deliberations held on 18.11.2021, 05.04.2022 and 22.07.2022 wherein some important decisions were taken vis-à-vis the course structure, course content and various operations aspects of the courses under reference. It emerged that following recommendations of the committee emanating out of its earlier meetings are relevant and appropriate in the present context and are reproduced below:

- **The salient points of the recommendations of the committee in its meeting held on 18.11.2021 are as follows:-**
  - The structure of the B.Tech. programmes would be designed in such a manner that there would be a minimum of 50% weightage to the major subject area of study with a maximum of 65% weightage and remaining weightage would be to the minor subject areas of study.
  - The students will have multiple exit options in line with the National Education Policy where a student who has completed one year of study and earned the requisite credits would be awarded a Certificate, with two years of study and earned the requisite credits would be awarded a Diploma, with three years of study and earned the requisite credits would be awarded Advance Diploma and on completion of four years would be awarded B.Tech. Degree.
  - The syllabi of these programmes would be devised taking into consideration the contemporary requirement of the programmes and its synergy with the industry and other premier engineering and technology institutions offering similar programmes of study at this level to make the students globally competitive both in terms of development of trained man power as well as their acceptability for conceptualization and implementation of successful startups through innovations.
  - The departments of Computer Engineering, Electronics and Communication Engineering and Electrical Engineering are required to be situated in the North Campus of the University for the purpose of logistic support and proximity of the majority of the faculties/departments in the North Campus of the University.
- **The salient points of the recommendations of the committee in its meeting held on 05.04.2022 are as follows:-**
  - The first two semesters of the four years B.Tech. courses in the disciplines under reference will be the foundation courses applicable for all the three

disciplines being taught with an aim to impart atleast preliminary level of technical knowhow to the students with a view to have appropriate orientation for the four years B.Tech. courses as well as help them to develop skills for employment opportunities, as skilled manpower, if at all the student requires to make an early exit after one year of completion of the course, as part of the multiple exit option adopted by the University under the UGCF 2022.

- o The deliberations of the committee on the UGCF 2022 brought out a few notable matters which requires further deliberation at the structural level which are as follows:
  - a) It was pointed out that B.Tech. Course structure does not envisage study of core disciplines at the VII<sup>th</sup> and VIII<sup>th</sup> semesters as the students are more inclined towards internship, placement, industry interface, availing international level opportunities in terms of gainful employment or higher studies. Therefore, it was felt by the committee that the Disciplines Specific Core (DSC) paper 19 and 20 placed at the VII<sup>th</sup> and VIII<sup>th</sup> semesters respectively may be shifted to V<sup>th</sup> and VI<sup>th</sup> semesters respectively to help the students in acquiring adequate knowledge and understanding of the core discipline at an earlier stage of their course, eventually helping in gaining better world view of the core area of knowledge.
  - b) UGCF 2022 envisages flexibility in terms of credit earning upto 26 credits per semesters which is 4 credits above the standard credit distribution of 22 credits per semester. It was felt that the flexibility may be increased to a maximum of 8 credits over and above the standard distribution of 22 credits to accommodate the students who are inclined for early completion of the credit requirement which will enable them to opt for full time industry internships in the 4<sup>th</sup> year of their course.
  - c) The committee felt it appropriate to introduce specific pool of courses under Generic Elective (GE) in the first two semesters of the UGCF 2022. Generic Electives on Engineering Workshop which imparts hands on training as well as

multidisciplinary perspectives on various disciplines in the field of Engineering and Technology are required to be included.

- d) Course under the Environmental Science and Sustainable Development under the Ability Enhancement Courses (AECs) under the UGCF 2022 is required to be fine tuned and made more contextual with respect to the students of B.Tech. courses and introductory knowledge on topics like Environmental Engineering, E-Waste Management, Environmental Impact Assessment (EIA) may be included. These inclusions will make the subject more relevant and appropriate in the overall context of B.Tech. course.
  - e) Introduction of a few Skill Enhancement Courses (SECs) under the UGCF 2022 which are specifically designed to cater the needs of the students pursuing B.Tech. degrees is required. Some examples courses under this category may be Engineering Workshop, Engineering Graphics, Object Orient Programming, MATLAB, Design Tools, Application designing and various other such courses which may be worked out while finalizing the course content in consultation with the subject specific experts.
  - f) UGCF 2022 envisages multiple exit options as part of the NEP 2020. The committee felt that the students who have sought admission for such prestigious and sought-after B.Tech. courses after qualifying the JEE Mains Examinations would be seldom interested in making an exit at various stages unless there is a pressing unavoidable circumstance for such decision making. Such a student would be definitely inclined to pursue the rest of the course by re entry at the next higher level where he/she had exited from the course. To effectuate such a situation, bridge courses are required to be formulated at the level of III<sup>rd</sup>, V<sup>th</sup> and VII<sup>th</sup> semester to facilitate such students to complete their course of study accordingly.
1. Taking a cue from the UGCF 2022 which deals with Bachelor of (Field of Study/Discipline) (Hons.), the committee deliberated upon the Discipline Specific

Courses (DSCs) to be included in the first two semesters where as many as six core subjects are to be identified and equally distributed in the two semesters.

2. It was felt by the committee that while formulating the course structure in consultation with the subject specific expert members, the syllabi of the various prominent national and international level may also be taken into consideration to make the courses globally comparable and research/ job oriented.
3. It emerged during the discussion that expert members are to be included from the various subject areas preferably from the Delhi NCR region to formulate the course content, initially for the first two semesters. Faculty members from various disciplines of the University in the field of Science and Applied Science are required to be included for a meaningful formulation of course content befitting to the requirement of the B.Tech. courses under reference. The formulation of the foundation course for the first two semesters are required to be prepared in such a manner that it is congruent and helps in the progression of courses from IIIrd semester onwards in a seamless manner.

- The salient points of the recommendations of the committee in its meeting held on 22.07.2022 are as follows:-
- Course structure and credit distribution of the semester I and semester II of the B.Tech. Computer Sciences and Engineering/ Electrical Engineering/ Electronics & Communication Engineering programmes.

Semester	Core (DSC) (04 Credits each)	Generic Elective (GE) (04 Credits each)	Ability Enhancement Course (AEC) (02 Credits each)	Skill Enhancement Course (SEC) (02 Credits each)	Value Addition Course (VAC) (02 Credits each)	Total Credits
I	DSC-1 DSC-2 DSC-3	Select a course from the specified list of GEs	Select a course from the specified list of AECs	Select a course from the specified list of SECs	Select a course from the specified list of VACs	22 credits

II	DSC-4 DSC-5 DSC-6	Select a course from the specified list of GEs	Select a course from the specified list of AECs	Select a course from the specified list of SECs	Select a course from the specified list of VACs	22 credits
						Total=44 Credits

- The committee also took note of the functional and operational aspects of the teaching learning in terms of credit distribution vis-à-vis the workload for a viable running of the programmes in the following manner:

### **Course Structure and content for the first two semesters of the 03 B.Tech Programmes**

The committee perused the course structure and course content for the first 02 semesters of the 04 year B.Tech programmes and recommended it for consideration by the Statutory Bodies of the University.

#### **I. Undergraduate Programme in Bachelor of Technology (B.Tech.)**

- As per the recommendations of UGCF 2022, the undergraduate degree courses in Faculty of Technology are eight semester courses spread over four academic years.
- The teaching – learning process envisaged and is student-centric and involves both theory and practical components.
- It offers a flexibility of programme structure while ensuring that the student gets a strong foundation in the subject and gains in-depth knowledge.
- Besides the different core courses (DSCs), a student can opt courses from the curriculum, comprising of DSEs, GEs, SECs, AECs and VACs, thereby, bringing out the multidisciplinary approach and freedom to choose these academic paths within the curriculum framework.



- Moreover, it allows a student maximum flexibility in pursuing his/ her studies at the undergraduate level to the extent of having the liberty to eventually design the degree with multiple exit options depending upon the needs and aspirations of the student in terms of his/ her goals of life, without compromising on the teaching learning, both in qualitative and quantitative terms. This will suit the present day needs of students in terms of securing their paths towards higher studies or employment.
- The minimum credit to be earned by a student per semester is 18 credits and the maximum is 26 credits. However, students are advised to earn 22 credits per semester. This provision is meant to provide students the comfort of the flexibility of semester-wise academic load and to learn at his/her own pace. However, the mandatory numbers of credits have to be secured for the purpose of award of Undergraduate Certificate/ Undergraduate Diploma/Undergraduate Advanced Diploma/ Appropriate Bachelor of Technology degree in (discipline).

#### **Exit options under UGCF**

<b>S. No.</b>	<b>Type of Award</b>	<b>Stage of Exit</b>	<b>Mandatory Credits to be secured for the award</b>
1	Undergraduate Certificate (in the field of Study/Discipline)	After successful completion of Semester II	44
2	Undergraduate Diploma (in the field of Study/Discipline)	After successful completion of Semester IV	88
3	Advanced Diploma (in the field of Study/Discipline)	After successful completion of Semester VI	132
4	Bachelor of Technology degree (Concept of Major & Minor)	After successful completion of Semester VIII	176

The committee suggested to have the wider consultation process of the draft first year syllabi of the courses and Prof. A.K. Tandon was authorized to provide the final draft first year syllabi after consultation with other external experts, which will form **Annexure II** of the Report. The committee also authorized the Vice Chancellor to consult experts to review the syllabi, if required.

The committee deliberated upon the fee structure to be adopted for the three B.Tech. Programmes. The committee was apprised that the University has proposed an overall fee structure for the three B.Tech. programmes as part of the Detailed Project Report (DPR) to the Ministry of Education. The Committee after due deliberations recommended the following fee structure of the 1<sup>st</sup> year admission of the B.Tech programmes. There will be 5% increase in each year for the total length of the four year programme.

Sl.No.	Particulars	Fee for B.Tech Programmes (Rs.)
1.	Tuition Fee	1,08,000/-
2.	University Student Welfare Fund	16,980/-
3.	Faculty/Department/ Student Welfare Fund	10,000/-
4.	University Development Fund	900/-
5.	University Facilities and Services Charges	20,000/-
6.	Faculty/Department Facilities and Services Charges	60,000/-
7.	Economically Weaker Section Support University Fund	100/-
8.	Delhi University Students Union (DUSU) Fund	20/-
	<b>TOTAL FEES</b>	<b>2,16,000/-</b>

The details of areas for utilization of the fee/ fund has been highlighted at **Annexure III** of the Report.

**Power to remove difficulties:** The committee authorized the Vice Chancellor to make necessary amendments to the recommendations of the committee, wherever required, in order to facilitate implementation of the recommendations of the committee on the ground, for starting the B.Tech. programmes, depending upon operational requirement and administrative convenience.

**Relaxation of payment of fees:** Keeping in mind the Institutional Social Responsibility (ISR) in terms of the availability of the opportunity to the otherwise eligible candidates economically challenged sections of the society, the committee recommended to waive off fees to be paid by a candidate at the time of admission to these programmes in the following manner:

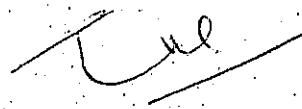
- Candidates whose parental income (Father and Mother taken together) is Rs. 04 lakhs or less will receive 90 percent waiver of fees at the time of admission. Such candidates will be required to be pay only examination fee and hostel fee as applicable from time to time.
- Candidates whose parental income (Father and Mother taken together) is more than Rs. 04 lakhs and less than 08 lakhs will receive 50 percent waiver of fees at the time of admission. Such candidates will be required to be pay only examination fee and hostel fee as applicable from time to time.
- **Eligibility Condition:** Such candidates shall be required to submit the Income Tax return of their parents (father and mother both) for the financial years 2020-21 and 2021-22. In case any of the parent is non working, a separate certificate is to be submitted in the prescribed format alongwith the application form at the time of seeking admission in the University. Such candidates shall also submit EWS certificate issued by prescribed authority. However, for the determination of Income, only ITR shall be used.
- **Laptop Reimbursement Scheme :** The committee further deliberated upon the requirement of adequate computer hardware facility in terms of laptops for the students and therefore the committee recommended that a student may be reimbursed the cost of a laptop or Rs. 50,000/- whichever is lower on production of proper invoice/bill to this effect. The amount may increase in subsequent years as decided by the University from time to time.

- There was a consensus that it would be appropriate to reimburse this amount of the cost of the laptop to the students as a student support facility before the beginning of the session so that the student is already equipped with the laptop facility on the first day of the academic session and is able to participate in the teaching - learning activities with the State of Art facilities. The basic hardware specification of a laptop, which will be essential for running the required softwares, will be provided to the students at the time of seeking admission in the University.

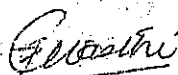
The meeting ended with a vote of thanks to the Chair.



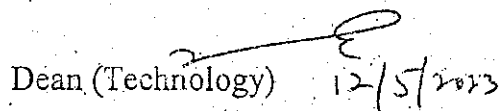
Prof. D. S. Chauhan  
(Chairperson)



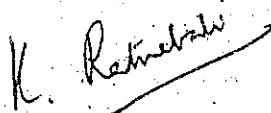
Prof. A.K. Tandon  
(External Expert Member)



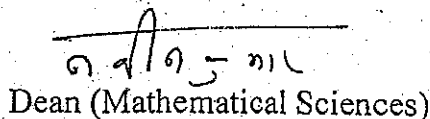
Dean (Science)



Dean (Technology)



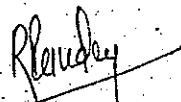
Dean (Academic Affairs)



Dean (Mathematical Sciences)



Prof. Madhusudan Singh  
(External Expert Member)



Prof. Rajeshwari Pandey  
(External Expert Member)



Joint Registrar (Academic)  
(Secretary)

**Procedure to be adopted for recruitment of faculty members under the  
Faculty of Technology**

**Procedure for submission of application:**

- I. The candidates are required to fill up the online application form.
- II. In case the candidate wishes to apply for more than one discipline, he/she should submit separate online application form alongwith requisite fees.

• **Procedure for selection:**

- I. The applications received will be scrutinized as per the eligibility criteria notified in the advertisement by the University for respective discipline.
- II. Status of a candidate in terms of his/her shortlisting shall be made available on the respective dashboard of the applicant on the website of the University i.e. [www.du.ac.in](http://www.du.ac.in).
- III. The eligible candidates will be required to download Admit Cards from the University website for appearing in the screening test.
- IV. The University shall conduct a screening test for short listing of candidates. The shortlisted candidates will make a presentation before a duly constituted committee by the Vice-Chancellor prior to appearing for interview before the Selection Committee.
- V. The screening test for the post of Assistant Professor will be based on prescribed syllabus available on University website.
- VI. The date of Screening Test will be notified in due course of time. The candidates are advised to keep on watching the University website for further updates.

- **EXEMPTION FROM SCREENING TEST**

**VII.** The exemption of screening test for the purpose of recruitment to the post of Assistant Professor is granted to the candidates having Ph.D degree in the relevant branch and:

- 1) the candidates has at-least one publication in Category I  
or
- 2) the candidate has at-least two publications in Category II  
or
- 3) the candidate has at-least five publications in Category II and Category III taken together

- **CATEGORIES:**

**CATEGORY I – OUTSTANDING RESEARCH  
PUBLICATION**

The paper must be a journal paper with impact factor at-least two, indexed in SCI/SSCI and published in the following

- Nature
- Science

The candidate must have major contribution either as a First author/Second author or Corresponding author.

## **CATEGORY II – PREMIER RESEARCH PUBLICATION**

The paper must be a journal paper with impact factor at-least 3.0 for Institute of Electrical & Electronics Engineers (IEEE) Transactions and one for all others, indexed in SCI/SSCI 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 (TRIF  $\geq 3.0$ )
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 SCI/SSCI or SCI expanded indexed journals with impact factor equal to or more than ten (10) will be counted in category II.

The candidate must have major contribute on either as a First author/Second author or Corresponding author.

### **CATEGORY III – COMMENDABLE RESEARCH PUBLICATION**

The paper must be a journal paper with impact factor at least one, indexed in SCI/SSCI or SCIexpanded and published in the following:

1. IEEE Transactions (TRIF < 3)
2. IEEE Journals
3. Springer
4. Elsevier (Science Direct)
5. Oxford University Press
6. Pergamon-Elsevier Science Ltd
7. Cambridge University Press
8. Wiley- Blackwell
9. Blackwell Publishing
10. John Wiley & Sons
11. Institute of Engineering and Technology (IET)
12. Biomedical Central Ltd
13. MIT Press
14. Indiana University Press
15. American Meteorological Society
16. American Physiological Society
17. American Society of Microbiology
18. American Chemical Society
19. American Institute of Physics
20. IOP Publishing Ltd.
21. Massachusetts Medical Society



22. IOS Press
23. Princeton University Press
24. Society of Industrial and Applied Mathematics
25. Proceedings of National Academy of Science of the USA

In additions to the above, SCI/SSCI or SCI expanded indexed journals not included in the above list having impact factor equal to or more than five (5) shall be considered for Category III. The candidate must have major contribution either as a First author/Second author or Corresponding author.

- VIII.** The candidates who wish to be considered for exemption from screening test should mention the same in the online application form. In case the exemption is claimed, necessary documents in support of the claim should be uploaded with the online application form.

• **WEIGHTAGE IN SCREENING TEST**

- IX.** The candidates having Ph.D Degree, who could not become eligible for exemption of screening test but have some good research papers as a 1<sup>st</sup> author/2<sup>nd</sup> author or corresponding author will be given weightage of 2% of maximum marks of screening test for each research paper in category II/III for the post of Assistant Professor. However, the maximum weightage including all weightages will not exceed 5% of the maximum marks of the screening test. The candidate must have major contribution in so published papers either as a 1<sup>st</sup> author/2<sup>nd</sup> author or corresponding author in all the papers submitted for consideration of weightages.

- **CATEGORIES:**

**CATEGORY II – PREMIER RESEARCH PUBLICATION**

The paper must be a journal paper with impact factor at-least three, indexed in SCI/SSCI 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 (TRIF  $\geq 3.0$ )
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 SCI/SSCI or SCI expanded indexed journals with impact factor equal to or more than ten (10) will be counted in category II.

The candidate must have major contribution either as a First author/Second author or Corresponding author.

### **CATEGORY III – COMMENDABLE RESEARCH PUBLICATION**

The paper must be a journal paper with impact factor at-least one, indexed in SCI/SSCI or SCI expanded and published in the following:

1. IEEE Transactions (TRIF<3)
2. IEEE Journals
3. Springer
4. Elsevier (Science Direct)
5. Oxford University Press
6. Pergamon-Elsevier Science Ltd
7. Cambridge University Press
8. Wiley- Blackwell
9. Blackwell Publishing
10. John Wiley & Sons
11. Institute of Engineering and Technology (IET)
12. Biomedical Central Ltd
13. MIT Press
14. Indiana University Press
15. American Meteorological Society
16. American Physiological Society
17. American Society of Microbiology
18. American Chemical Society
19. American Institute of Physics
20. IOP Publishing Ltd.
21. Massachusetts Medical Society

22. IOS Press
23. Princeton University Press
24. Society of Industrial and Applied Mathematics
25. Proceedings of National Academy of Science of the USA

In addition to the above, SCI/SSCI or SCI expanded indexed journals not included in the above list having impact factor equal to or more than five (5) shall be considered for Category III.

The candidate must have major contribution either as a First author/Second author or Corresponding author.

- X. The candidates who wish to be considered for weightage in the screening test should mention the same in the online application form. In case the weightage in the screening test is claimed, necessary documents in support of the claim should be submitted alongwith the printout of the online application form.
- XI. The candidates shortlisted from the screening test and those who have been exempted from the screening test shall be called for presentation and interview on the notified dates on the University website.

• **PAY SCALE, ESSENTIAL QUALIFICATIONS, RELEVANT  
BRANCH & RELAXATIONS FOR THE POST OF ASSISTANT  
PROFESSOR:**

**COMPUTER SCIENCE AND ENGINEERING,**

S. No	Designation, Pay Band and Academic Grade Pay (AGP)	Essential Qualifications	Relevant Branch
1	Assistant Professor with Academic Pay Level 10 as per 7 <sup>th</sup> CPC	<p>B.E./B.Tech./B.S. and M.E./M.Tech./M.S. or Integrated M.Tech. in relevant branch with first class or equivalent in any one of the degrees.</p> <p>‘OR’</p> <p>1<sup>st</sup> class MCA and 1<sup>st</sup> class in M.Tech in relevant branch from a recognized University</p> <p>‘OR’</p> <p>1<sup>st</sup> class or equivalent in B.E./B.Tech in</p>	<ul style="list-style-type: none"> <li>• Advanced Communication and Information System</li> <li>• Advanced Electronics &amp; Communication Engineering</li> <li>• Artificial Intelligence</li> <li>• Computer and Communication Engineering</li> <li>• Computer Applications</li> <li>• Computer Engineering</li> <li>• Computer Engineering &amp; Applications</li> <li>• Computer Networking</li> <li>• Computer Science</li> <li>• Computer Science &amp; Engineering</li> <li>• Computer Science &amp; Information Technology</li> <li>• Computer Technology &amp; Applications</li> <li>• Computer Science &amp; Technology</li> <li>• Computer Science and Systems Engineering</li> <li>• Computer Technology</li> <li>• Electrical &amp; Electronics Engineering</li> </ul>

		<p>relevant branch/I<sup>st</sup> class in MCA and Ph.D in relevant branch from a recognized University</p>	<ul style="list-style-type: none"> <li>• Electrical Engineering</li> <li>• Electronic &amp; Computer Engineering</li> <li>• Electronic Engineering</li> <li>• Electronics &amp; Communication Engineering</li> <li>• Electronics &amp; Instrumentation</li> <li>• Electronics &amp; Telecommunication Engineering</li> <li>• Information &amp; Communication Technology</li> <li>• Information Engineering</li> <li>• Information Science &amp; Engineering</li> <li>• Information Science &amp; Technology</li> <li>• Information Security</li> <li>• Information Systems</li> <li>• Information Technology</li> <li>• Information Technology &amp; Engineering</li> <li>• Mathematics &amp; Computing</li> <li>• Mobile &amp; Pervasive Computing</li> <li>• Software Engineering</li> <li>• Software Systems</li> <li>• Software Technology</li> <li>• Software Testing</li> <li>• VLSI Design</li> <li>• Web Designing</li> <li>• Web Technologies</li> <li>• 3-D Animation &amp; Graphics</li> <li>• Applied Electronics and Instrumentation</li> <li>• Microelectronics</li> </ul>
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## ELECTRONICS & COMMUNICATION ENGINEERING

S. No	Designation, Pay Band and Academic Grade Pay (AGP)	Essential Qualifications	Relevant Branch
1	Assistant Professor with Academic Pay Level 10 as per 7 <sup>th</sup> CPC	<p>B.E./B.Tech./B.S. and M.E./M.Tech./M.S. or Integrated M.Tech. in relevant branch with first class or equivalent in any one of the degrees.</p> <p>'OR'</p> <p>Ist class or equivalent in B.E./B.Tech in relevant branch and Ph.D. in relevant branch from a recognized University</p>	<ul style="list-style-type: none"> <li>• Advanced Electronics</li> <li>• Advanced Electronics and Communication Engineering</li> <li>• Applied Electronics</li> <li>• Applied Electronics &amp; Instrumentation Engineering</li> <li>• Applied Electronics And Communications</li> <li>• Advanced Communication And Information System</li> <li>• Advanced Computer Aided Design</li> <li>• Biomedical Electronics</li> <li>• Biomedical Signal Processing</li> <li>• Computer Engineering</li> <li>• Computer Engineering &amp; Application</li> <li>• Communication &amp; Signal Processing</li> <li>• Computer And Communication Engineering</li> <li>• Computer Applications</li> <li>• Computer Engineering</li> <li>• Computer Engineering</li> </ul>

			&Applications • Computer Science & Engineering • Computer Science & Technology Communication And Information Systems • Communication And Networking • Communication Engineering • Communication Engineering And Signal Processing • Communication Networks • Communication Systems • Digital Design • Digital Electronics • Digital Electronics & Microprocessor • Digital Electronics And Communication • Digital Electronics And Communication Engineering • Digital Electronics And Communication Systems • Digital Electronics Engineering • Digital Image Processing • Digital Signal Processing • Digital Systems • Digital Communication • Digital Communication Engineering • Digital Communications And Networking • Digital Systems And Computer
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			<p>Electronics</p> <ul style="list-style-type: none"> <li>• Electronic Engineering</li> <li>• Electronics &amp; Communication Engineering</li> <li>• Electronics &amp; Computer Science</li> <li>• Electronics (Fiber Optics)</li> <li>• Electronics (Robotics)</li> <li>• Electronics And Biomedical Engineering</li> <li>• Electronics And Communication Engineering (Microwaves)</li> <li>• Electronics And Communications Engineering</li> <li>• Electronics And Control Systems</li> <li>• Electronics And Electrical Engineering</li> <li>• Electronics And Electrical Communication Engineering</li> <li>• Electronics And Telecommunications Engineering</li> <li>• Electronics And Telematics Engineering</li> <li>• Electronics Design Technology</li> <li>• Electronics Engineering</li> <li>• Electronics Engineering (Industry Integrated)</li> <li>• Electronics Engineering (Micro Electronics)</li> <li>• Electronics Engineering (Specialization In Consumer Electronics)</li> </ul>
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			<ul style="list-style-type: none"> <li>• Electronics Engineering With Microprocessor</li> <li>• Electrical Engineering</li> <li>• Electronics System Engineering</li> <li>• Electronics Technology Embedded System &amp; Computing</li> <li>• Embedded System And VLSI</li> <li>• Embedded System And VLSI Design</li> <li>• Embedded Systems</li> <li>• Embedded Systems Technologies</li> <li>• Image Processing</li> <li>• Industrial Electronics</li> <li>• Integrated Circuits Technology</li> <li>• Integrated Electronics And Circuits IC Design</li> <li>• Information Technology</li> <li>• Information Science &amp; Engineering</li> <li>• Information Science &amp; Technology</li> <li>• Information Security</li> <li>• Information Systems</li> <li>• Information Technology &amp; Engineering</li> <li>• Mobile &amp; Pervasive Computing</li> <li>• Medical Electronics</li> <li>• Medical Electronics Engineering</li> <li>• Micro And Nano Electronics</li> </ul>
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			<ul style="list-style-type: none"> <li>• Micro Electronics</li> <li>• Micro Electronics &amp; VLSI Design</li> <li>• Micro Electronics And Control Systems</li> <li>• Micro Electronics Engineering</li> <li>• Microelectronics &amp; VLSI Design</li> <li>• Mobile Technology</li> <li>• Microwave &amp; Optical Communication</li> <li>• Microwave And Communication Engineering</li> <li>• Microwave And Millimeter Engineering</li> <li>• Microwave And Radar Engineering</li> <li>• Microwave And TV Engineering</li> <li>• Microwave Engineering</li> <li>• Microwaves</li> <li>• Microwave And Optical Communication</li> <li>• Mobile Communication</li> <li>• Mobile Communication And Network Technology</li> <li>• Modern Communication Engineering</li> <li>• Nano Science &amp; Technology</li> <li>• Nano Electronics</li> <li>• Nano Technology</li> <li>• Optics And Optoelectronics</li> <li>• Opto Electronics &amp; Communication Systems</li> <li>• Optoelectronics &amp; Communication</li> <li>• Opto-Electronics Engineering</li> <li>• Optoelectronics -Optical Communication</li> <li>• Optical Communication</li> </ul>
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			<ul style="list-style-type: none"> <li>• Radar &amp; Communication</li> <li>• Radio Frequency And Microwave Engineering</li> <li>• Radar And Satellite Communication</li> <li>• Radio Physics And Electronics</li> <li>• RF And Photonics</li> <li>• Signal Processing</li> <li>• Signal Processing and Digital Design</li> <li>• Signal Processing And Communications</li> <li>• Signal Processing And Embedded Systems</li> <li>• Telecommunication Engineering</li> <li>• VLSI</li> <li>• VLSI Design</li> <li>• VLSI And Embedded Systems</li> <li>• VLSI And Embedded Systems Design</li> <li>• VLSI And Microelectronics</li> <li>• VLSI Design And Embedded Systems</li> <li>• VLSI Design And Signal Processing</li> <li>• VLSI Design And Testing</li> <li>• VLSI System Design</li> <li>• VLSI Systems</li> <li>• VLSI Design Tools And Technology</li> <li>• Wireless And Mobile Communications</li> <li>• Wireless Sensor Networks</li> <li>• Wireless Communication &amp; Computing</li> <li>• Wireless Communication Technology</li> <li>• Wireless Communications</li> </ul>
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			<ul style="list-style-type: none"> <li>• Wireless Networks And Applications</li> <li>• Instrumentation Engineering</li> <li>• Instrumentation and Control Engineering</li> <li>• Power Electronics</li> </ul>
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## ELECTRICAL ENGINEERING

S. No	Designation, Pay Band and Academic Grade Pay (AGP)	Essential Qualifications	Relevant Branch
1	Assistant Professor with Academic Pay Level 10 as per 7 <sup>th</sup> CPC	<p>B.E./B.Tech./B.S. and M.E./M.Tech./M.S. or Integrated M.Tech. in relevant branch with first class or equivalent in any one of the degrees.</p> <p style="text-align: center;">‘OR’</p> <p>Ist Class or equivalent in B.E./B.Tech in relevant branch and Ph.D. in relevant branch from a recognized University</p>	<ul style="list-style-type: none"> <li>• Electrical Engineering</li> <li>• Electrical &amp; Electronics Engineering</li> <li>• Electronics Engineering</li> <li>• Electronics &amp; Communication Engineering</li> <li>• Electronics and Electrical Communication Engineering</li> <li>• Instrumentation &amp; Control Engineering</li> <li>• Control &amp; Instrumentation</li> <li>• Power Engineering</li> <li>• Electronics &amp; Applied Instrumentation Engineering</li> <li>• Instrumentation Engineering</li> <li>• High Voltage Engineering</li> <li>• Electrical Machine &amp; Drives</li> <li>• Drive &amp; Power Electronics</li> <li>• Power Systems</li> <li>• Power Electronics &amp; Drives</li> <li>• Power Apparatus &amp; Systems</li> <li>• Electrical Machines</li> <li>• Power Apparatus &amp; Electric Drives</li> <li>• Systems and Control</li> <li>• System Engineering</li> <li>• Energy Systems</li> <li>• Microwave &amp;</li> </ul>

			<p>Optical Communication</p> <ul style="list-style-type: none"> <li>• Communication Systems</li> <li>• Signal Processing &amp; Embedded System</li> <li>• Process Control</li> <li>• Control Engineering</li> <li>• Measurement &amp; Instrumentation</li> <li>• Digital Design</li> <li>• Microelectronics &amp; VLSI Design</li> <li>• RF and Microwave Engineering</li> <li>• Telecommunication Systems Engineering</li> <li>• Power and Energy Systems</li> <li>• Machine Drives &amp; Power Electronics</li> <li>• Robotics System</li> <li>• Communication Engineering</li> <li>• Control and Computing</li> <li>• Power Electronics &amp; Power Systems</li> <li>• Electronics Systems</li> <li>• Power and Control</li> <li>• Signal Processing</li> <li>• Signal Processing &amp; Digital Design</li> <li>• Machine Drives &amp; Power Electronics</li> <li>• Power &amp; Energy Systems Engineering</li> <li>• Instrumentation &amp; Signal processing</li> </ul>
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			<ul style="list-style-type: none"> <li>• Advance Communication and Information System</li> <li>• Advanced Electrical Power System</li> <li>• Advanced Electronics</li> <li>• Advanced Electronics and Communication Engineering</li> <li>• Applied Electronics</li> <li>• Applied Electronics and Communications System</li> <li>• Applied Instrumentation</li> <li>• Automation and control</li> <li>• Power Systems</li> <li>• Bio Electronics</li> <li>• Biomedical Electronics</li> <li>• Biomedical Signal Processing and Instrumentation</li> <li>• Communication Engineering and Signal Processing</li> <li>• Computer Applications In Industrial Drives</li> <li>• Control Engineering</li> <li>• Digital Communication</li> <li>• Digital Communication and Networking Digital Electronics</li> <li>• Digital Electronics and Communication Engineering</li> <li>• Digital Electronics and Engineering</li> <li>• Digital Image processing</li> <li>• Digital Instrumentation</li> <li>• Digital Signal Processing</li> <li>• Digital Systems</li> <li>• Digital Systems and Communication</li> <li>• Electric Power System</li> <li>• Electrical Drive and Power</li> </ul>
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			<p>Engineering</p> <ul style="list-style-type: none"> <li>• Electrical and Power Engineering</li> <li>• Electrical Energy Systems</li> <li>• Electrical Engineering (Instrumentation &amp; Control)</li> <li>• Electrical Instrumentation and Control Engineering</li> <li>• Electrical Power &amp; Energy Systems</li> <li>• Electrical Power Systems</li> <li>• Electronics Circuits and System Design</li> <li>• Electronics &amp; Communication (VLSI Design)</li> <li>• Electronics &amp; Instrumentation Engineering</li> <li>• Electronic &amp; Telecommunication Engineering</li> <li>• Electronic and Control Systems</li> <li>• Electronics and Telecommunication Engineering (Radio and Systems)</li> <li>• Electronics Communication and Instrumentation Engineering</li> <li>• Electronics</li> <li>• Design and Technology Electronics Product Design and Technology</li> <li>• Electronics Systems and Communication</li> <li>• Electronics Technology</li> <li>• Electronics Tele Communication</li> <li>• Embedded and Real Time Systems</li> <li>• Embedded Systems and VLSI Design</li> </ul>
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			<ul style="list-style-type: none"> <li>• Embedded Systems</li> <li>• Embedded Systems Technologies.</li> <li>• Energy Engineering</li> <li>• Guidance and Navigation Control</li> <li>• Guided Missiles</li> <li>• High Voltage and Power System Engineering</li> <li>• Illumination Engineering</li> <li>• Illumination Technology &amp; Design</li> <li>• Image Processing</li> <li>• Industrial Automation &amp; RF Engineering</li> <li>• Industrial drives and Control</li> <li>• Industrial Electronics</li> <li>• Industrial Power Control and Drives</li> <li>• Instrumentation Engineering</li> <li>• Integrated Circuits Technology</li> <li>• Integrated Power Systems</li> <li>• Micro and Nano Electronics</li> <li>• Micro Electronics &amp; VLSI designs</li> <li>• Micro Electronics and Control Systems</li> <li>• Micro Electronics Engineering</li> <li>• Microwave and Optical Communication Engineering</li> <li>• Microwave and Communication Engineering</li> <li>• Microwave and millimeter Engineering</li> <li>• Microwave and Radar Engineering</li> <li>• Microwave and TV Engineering</li> <li>• Microwave Engineering</li> </ul>
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			<ul style="list-style-type: none"> <li>• Optics and Optoelectronics</li> <li>• Optoelectronics &amp; Communication</li> <li>• Optoelectronics and Laser Technology</li> <li>• Optoelectronics Engineering</li> <li>• Power and Energy Engineering</li> <li>• Power and Industrial Drives</li> <li>• Power Control and drives</li> <li>• Power Electronics and Control</li> <li>• Power Electronics and Electrical Drives</li> <li>• Power Electronics and Machine Drives</li> <li>• Power Electronics and Systems</li> <li>• Power Electronics Engineering</li> <li>• Power Engineering and Energy Systems</li> <li>• Power system and Control</li> <li>• Power System and Control Automation</li> <li>• Power System with Emphasis on H.V. Engineering</li> <li>• Power Systems and Automation</li> <li>• Power Systems and Power Electronics</li> <li>• Power Systems Control and Automation Engineering</li> <li>• Radio Physics and Electronics</li> <li>• Reliability Engineering</li> <li>• Renewable Energy</li> <li>• Sensor Technology</li> <li>• Signal Processing and Communication</li> </ul>
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			<ul style="list-style-type: none"> <li>• Solar Power Systems</li> <li>• Telecommunication Engineering</li> <li>• Telematics</li> <li>• VLSI and Embedded Systems Design</li> <li>• VLSI and Microelectronics</li> <li>• VLSI Design</li> <li>• VLSI Design and Embedded Systems</li> <li>• VLSI Design and Signal Processing</li> <li>• VLSI Design and Testing</li> <li>• VLSI System Design</li> <li>• VLSI Systems</li> <li>• Applied electronics and Instrumentation Engineering</li> <li>• Biomedical Engineering</li> <li>• Biomedical Instrumentation</li> <li>• Electrical and Electronics (Power System)</li> <li>• Electrical and Instrumentation Engineering</li> <li>• Electrical and Power Engineering</li> <li>• Electrical Engineering (Electronics &amp; Power)</li> <li>• Electrical Engineering Industrial Control</li> <li>• Electrical Instrumentation and Control Engineering</li> <li>• Electrical, Electronics and Power</li> <li>• Electronics Science and Engineering</li> <li>• Electronic Instrumentation and Control Engineering</li> <li>• Electronics &amp; Telecommunication Engineering</li> <li>• Electronics and Computer</li> </ul>
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			<p>Engineering</p> <ul style="list-style-type: none"> <li>• Electronics and Control Systems</li> <li>• Electronics and Electrical Engineering</li> <li>• Electronics and Power Engineering</li> <li>• Electronics System Engineering</li> <li>• Information Technology and Engineering</li> <li>• Instrument Technology</li> <li>• Instrumentation &amp; Electronics</li> <li>• Mechatronics Engineering</li> <li>• Medical Electronics Engineering</li> <li>• Power Electronics and Instrumentation Engineering</li> <li>• Energy and Environment Management</li> </ul>
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## APPLIED SCIENCES AND HUMANITIES

S. No	Designation, Pay Band and Academic Grade Pay (AGP)	Essential Qualifications	Relevant Branch
1	Assistant Professor with Academic Pay Level 10 as per 7 <sup>th</sup> CPC	<p>As per the qualification for the post of Assistant Professor in the University Departments of the University of Delhi for the disciplines of Science, Arts and Humanities. Please refer to <b>Annexure IV.</b></p> <p style="text-align: center;">‘OR’</p> <p>B.E./B.Tech./B.S. and M.E./M.Tech./M.S. or Integrated M.Tech. in relevant branch with first class or equivalent in any one of the degrees from a recognized University.</p> <p style="text-align: center;">‘OR’</p> <p>Ist class or equivalent in</p>	<p><b><u>GROUP I</u></b></p> <ul style="list-style-type: none"> <li>• Mathematics</li> <li>• Applied Mathematics</li> <li>• Mathematical Statistics</li> <li>• Mathematics &amp; Computing</li> <li>• Mathematics &amp; Computer Applications</li> </ul> <p><b><u>GROUP II</u></b></p> <ul style="list-style-type: none"> <li>• Physics</li> <li>• Applied Physics</li> <li>• Engineering Physics</li> <li>• Electronics</li> <li>• Electronic Science</li> </ul> <p><b><u>GROUP III</u></b></p> <ul style="list-style-type: none"> <li>• Environment Science</li> <li>• Environment Engineering</li> <li>• Civil Engineering</li> </ul>

		B.E./B.Tech in relevant branch and Ph.D. in relevant branch from a recognized University	<p><b><u>GROUP IV</u></b></p> <ul style="list-style-type: none"> <li>• Psychology</li> <li>• Applied Psychology</li> <li>• Communication Skills</li> <li>• English</li> </ul>
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**Notes :**

1. Any deviation in the nomenclature of the relevant branches or degrees as mentioned above may also be considered by the University.
2. AMIE/IETE qualifications in relevant branches mentioned in the RR are also eligible.
3. B.Sc. (Engineering), B.E., B.Tech, B.S. (Four years) shall be considered as equivalent.
4. M.Sc. (Engineering), M.E., M.Tech, M.S. shall be considered as equivalent.
5. Selection Committee, may in cases of exceptional merit, recommend additional increments in case of higher qualifications, experience and academic achievements by the candidates.
6. Persons already in employment in Government Department/Autonomous Bodies/Universities under Central/State Government should apply through proper channel.
7. If a class/division is not awarded, minimum of 60% marks in aggregate shall be considered equivalent to first class/division.
8. In case, procedure for conversion of Grade Point to percentage of marks is mentioned on the degree itself, the same shall be applied or otherwise, Grade Point in 10 point scale system will be adopted and the Cumulative Grade Point Average will be converted into equivalent marks as below :-

$$\text{"Percentage of marks"} = 10 \times \text{CPGA}"$$

## **Annexure II**

### **FACULTY OF TECHNOLOGY**

- **Department of Computer Engineering**
- **Department of Electronics and Communication Engineering**
- **Department of Electrical Engineering**

#### **Syllabi of Bachelor of Technology (B.Tech.) Programmes**

- **Computer Science and Engineering**
- **Electronics and Communication Engineering**
- **Electrical Engineering**

**Effective from Academic Session 2023-24**



**UNIVERSITY OF DELHI****FACULTY OF TECHNOLOGY****Bachelor of Technology (B.Tech.)**

- Computer Science and Engineering
- Electronics and Communication Engineering
- Electrical Engineering

**Semester-I**

Sr. No.	Course Domain	Course Title	Hours per week			Total Course Hrs. per week	Credits
			L	T	P		
1.	DSC-1	Mathematics-I	3	1	0	4	4
2.	DSC-2/ DSC-5*	Physics OR Introduction to Electrical and Electronics Engineering	3	0	2	5	4
3.	DSC-3	Fundamentals of Computer Programming	3	0	2	5	4
4.	GE	Select a course from the specified list of GEs					4
5.	AEC	Select a course from the specified list of AECs					2
6.	SEC	Select a course from the specified list of SECs					2
7.	VAC	Select a course from the specified list of VACs					2
<b>Total Credits</b>							<b>22</b>

**NOTE:**

\*1. Half of the students enrolled will take up Physics and half of the students will take up Introduction to Electrical & Electronics Engineering in the Semester I and vice versa in the Semester II.

### Bachelor of Technology (B.Tech.)

- Computer Science and Engineering
- Electronics and Communication Engineering
- Electrical Engineering

#### Semester-II

Sr. No.	Course Domain	Course Title	Hours per week			Total Contact Hrs. per week	Credits
			L	T	P		
1.	DSC-4	Mathematics-II	3	1	0	4	4
2.	DSC-5/ DSC-2*	Introduction to Electrical and Electronics Engineering OR Physics	3	0	2	5	4
3.	DSC-6	Data Structures	3	0	2	5	4
4.	GE	Select a course from the specified list of GEs					4
5.	AEC	Select a course from the specified list of AECs					2
6.	SEC	Select a course from the specified list of SECs					2
7.	VAC	Select a course from the specified list of VACs					2
<b>Total Credits</b>							<b>22</b>

**NOTE:**

\*1. Half of the students enrolled will take up Physics and half of the students will take up Introduction to Electronics & Electrical Engineering in the Semester I and vice versa in the Semester II.

### **LIST OF SKILL ENHANCEMENT COURSES (SECs)**

1. Computer Workshop (Course Credit: 0L-0T-2P, Course Hours: 0L+0T+4P)
2. Electronics Workshop (Course Credit: 0L-0T-2P, Course Hours: 0L+0T+4P)
3. Electrical Workshop (Course Credit: 0L-0T-2P , Course Hours: 0L+0T+4P)

### **LIST OF GENERIC ELECTIVES (GEs)**

The students will be offered a list of Generic Electives as decided by the university from time to time.

### **LIST OF ABILITY ENHANCEMENT COURSES (AECs)**

The students will be required to choose these courses from a pool of courses offered by the University as per UGCF-2022

### **LIST OF VALUE ADDITION COURSES (VACs)**

The students will be required to choose these courses from a pool of courses offered by the University as per UGCF-2022

## PROGRAM OUTCOMES

Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Assessment & Scheme of examination:**

As per University of Delhi rules as applicable from time to time.

## MATHEMATICS-I (DSC-1)

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Mathematics-I	4	3L	1T	0P	Class XII with Physics, Chemistry and Mathematics	NIL

**Course Hours: L: 03 T: 01 P: 00**

#### Course Objectives:

To teach students concepts of Linear Algebra, Vectors and Calculus and apply them for problem solving.

#### Course Outcomes:

After completing the course, the students should be able to:

1. Develop a basic understanding of the linear algebra, vectors and calculus use in engineering
2. Solve mathematical problems of vector spaces and matrices
3. Derive calculus theorems and use these to solve some integral problems.
4. Apply calculus to solve suitable engineering applications

#### Unit-I

Matrices: Matrices, Vectors: addition and scalar multiplication, Matrix multiplication, Linear systems of equations, Linear Independence, Rank of a

matrix, Determinants, Cramer's Rule, Inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

## **Unit-II**

Vector spaces I: Vector Space, Linear dependence of vectors, Basis, Dimension, Range and kernel, Rank and nullity, Inverse of a linear transformation, Rank nullity theorem,

## **Unit-III**

Vector spaces II: Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric and Orthogonal Matrices, Eigenbases, Diagonalization, Inner product spaces, Gram-Schmidt orthogonalization.

## **Unit-IV**

Calculus: Indeterminate forms and L'Hospital's rule, Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems, Evaluation of definite and improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions, Beta and Gamma functions and their properties.

### **Suggested Readings\*:**

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson Education.
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
3. D. Poole, Linear Algebra: A Modern Introduction, Brooks Cole.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Limited.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
7. V. Krishnamurthy, V.P. Mainra and J. L. Arora, An introduction to Linear Algebra, Affiliated East-West Press Private limited

\*Latest Edition of the books to be followed.

## PHYSICS (DSC-2)

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Physics	4	3L	0T	1P	Class XII with Physics, Chemistry and Mathematics	NIL

**Course Hours: L: 03 T: 00 P: 02**

#### Course Objectives:

To teach students basic concepts of atomic structures, mechanics, electron theory, semiconductors and investigate their characteristics and applicability.

#### Course Outcomes:

After completing the course, the students should be able to:

1. Develop a basic understanding of concepts of atomic structures, electron theory and semiconductors.
2. Correlate mechanics and electron theory with engineering applications.
3. Apply concepts of semiconductor junctions and operations for device operations.
4. Plot characteristics of the studied devices, measure their characteristics and use these for some practical applications.



## **UNIT – I**

Review of Atomic Structure and Statistical Mechanics: - Ideas on Atomic Structure, Quantum Mechanics, The Schrodinger Wave Equation, Statistical Mechanics, Bonding of atoms, Crystalline state

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect band gaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Occupation probability, Fermi level, Effective mass, Phonons.

## **UNIT - II**

Elemental and compound semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, The Hall Effect, Einstein Relations, Excess carriers in semiconductors p-n junction, Excess carriers and Quasi-Fermi Levels, Basic equations for semiconductor device operation, Solution of carrier transport equation.

## **UNIT - III**

P-N Junctions: - The abrupt junction (Electric field, potential, capacitance), V-I characteristic of an ideal diode, a real diode. Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices  
Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Joint density of states, Density of states for photons, Transition rates (Fermi's golden rule), Optical loss and gain; Photovoltaic effect, Exciton, Drude model.

## **UNIT – IV**

Four-point probe and measurements for carrier density, resistivity, and hall mobility; Hot-point probe measurement, capacitance-voltage measurements, parameter extraction from diode I-V characteristics, DLTS, band gap by UV-VIS spectroscopy, absorption/transmission.

Density of states in 2D, 1D and 0D (qualitatively). Practical examples of low-dimensional systems such as quantum wells, wires, and dots: design, fabrication, and characterization techniques. Heterojunctions and associated band- diagram.

**Note:** Course coordinator will prepare a list of experiments and lab manual for the Practicals covering the whole syllabus.

**Suggested Readings\*:**

1. Pierret, Semiconductor Device Fundamental,
2. P. Bhattacharya, Semiconductor Optoelectronic Devices, Pearson Education
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc.
4. B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc.
5. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley
6. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York.
7. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
8. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar, Deepak Gupta on NPTEL.

\*Latest Edition of the books to be followed.

## INTRODUCTION TO ELECTRICAL AND ELECTRONICS ENGINEERING (DSC-5)

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre- requisit e of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Introduction to Electrical and Electronics Engineering	4	3L	0T	1P	Class XII with Physics, Chemistr y and Mathema tics	NIL

**Course Hours: L: 03 T: 00 P: 02**

**Course Objectives:**

To solve electric circuits, to characterize motors, bipolar devices, and multi stage amplifiers

**Course Outcomes:**

After completing the course, the students should be able to:

1. Solve various DC & AC circuits using applicable theorems.
2. Demonstrate the working of electric motors using different laws and principles
3. Characterize and measure properties of bipolar devices
4. Conceptualize multi stage amplifiers and apply these for engineering applications.

### **Unit I: D.C. and A.C. Circuits:**

Introduction to circuit elements, uncontrolled energy sources, Kirchhoff's laws, Superposition, Thevenin's, Norton's and maximum power transfer Theorems, AC Fundamentals: Sinusoidal a.c. quantities, instantaneous, maximum, average and effective values, Phasor representation, Steady state response of series and parallel R-L, R-C and R-L-C circuits, Concept of impedance and admittance, J-method, Active, Reactive and Apparent Power.

### **Unit II: Transformers and Electric Motors:**

Electromagnetism: Simple magnetic circuits, Electric Circuit analogy. Electromagnetically induced EMF and Induced Force on a conductor. Faraday's Law, Lenz's Law Concept of Self and Mutual Inductance, Transformers: Construction and operation of single phase transformer, EMF equation, Losses, Efficiency and applications of transformers, Electrical Motors: Construction details of D.C. Motor, Equations, operating characteristics and applications of shunt, series and Compound Motors, Construction, operation and application of different types of single phase induction motors, Measuring Instruments: Moving coil and moving iron Voltmeters and ammeters and extension of range, Dynamometer type wattmeter.

### **Unit III: Devices and Circuits:**

PN Junction diode and its use in Rectifier circuits, Capacitive and Inductive filters, Operation and application of special diodes: Zener diode, photodiode, and light emitting diode (LED), Construction and operation of Bi-polar junction transistors, Characteristics under CB, CE, CC configurations, Voltage and current gains, input and output resistances, Biasing of transistors, load line and operating point, Transistor as a switch, Introduction to FET, UJT SCR, Triac and Diac, their characteristics and applications.

### **Unit IV: Multi Stage Amplifiers:**

R-C coupled amplifier and its frequency response, concept of Bandwidth, Push pull amplifiers, Feedback amplifiers: Classification of feedback amplifiers, Gain, input & output resistance of feedback amplifiers, Advantage of negative feedback, Measuring Instruments: Digital voltmeters, Digital multimeters, CRO and its applications. DSO and oscilloscope probes.

**Note:** Course coordinator will prepare a list of experiments and lab manual for the Practicals covering the whole syllabus.

**Suggested Readings\*:**

1. Electrical and Electronics Technology by Hughes Revised by John H. Ley, Et al, Pearson
2. Principles of Electrical Engineering by Del-Toro. Pearson.
3. S.N. Singh, Basic Electrical Engineering, S.N. Singh, PHI Learning Private Limited.
4. Boylestad, R.L. and Nashelsky, L. Electronic Devices and Circuit Theory. Pearson Education.
5. Millman, J. and Grabel, A. Microelectronics. McGraw-Hill, Incl.
6. Malvino, A. and Bates, D. Electronic Principles, with Simulation CD, McGraw-Hill, Inc.

\*Latest Edition of the books to be followed.

## FUNDAMENTALS OF COMPUTER PROGRAMMING (DSC-3)

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Fundamentals of Computer Programming	4	3L	0T	1P	Class XII with Physics, Chemistry and Mathematics	NIL

**Course Hours: L: 03 T: 00 P: 02**

#### Course Objectives:

To teach students computer fundamentals and do programming using C for problem solving.

#### Course Outcomes:

After completing the course, the students should be able to:

1. Explain the use of software and programming for problem solving.
2. Develop programming using simple concepts of input, output and control statements.
3. Apply arrays, functions, strings, structures, and pointers for problem solving.
4. Design and implement solutions for data handling with permanent storage using modular programming and files

#### Unit I

**Programming Fundamentals & Control Statements:** Block Diagram of Computer, Hardware vs software, concept of operating system and compiler, Introduction to C programming, basic programming using input and output

operators and expressions, programming using if and if-else, Programming using looping-for, while, do-while; use of switch and break.

## **Unit II**

**Arrays based Programming:** Defining and processing 1-D and 2-D Arrays for Problem solving, string as array of char and its processing

## **Unit III**

**Modular programming using Functions:** Structured Programming, storage classes defining and calling a function, modular programming using functions, passing arguments and arrays to functions, functions of void and returning values. Recursion, file handling

## **Unit IV**

**Programming using pointers, structures and unions:** Pointers in C: Pointer declaration, Passing Pointer to functions, pointers vs arrays, dynamic memory allocation. Structures and Unions, Programming Using Array of Structures and Unions, Memory Requirements for Unions.

**Note:** The programming language to be used for teaching and implementation will be C. The Course coordinator will prepare a list of experiments and lab manual for the Practicals covering the whole syllabus.

### **Suggested Readings\*:**

1. Byron S. Gottfried, Programming with C Language, Schaum Series, Tata McGraw Hill.
2. E Balaguruswamy, Programming with C, Tata McGraw Hill.
3. Kernighan & Richie, C Programming, Prentice Hall of India.

\*Latest Edition of the books to be followed.

## MATHEMATICS-II (DSC-4)

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Mathematics-II	4	3L	1T	0P	Class XII with Physics, Chemistry and Mathematics	NIL

**Course Hours: L: 03 T: 01 P: 00**

#### Course Objectives:

To teach students process of doing Laplace and Fourier transformation, apply probability distributions over random variables, and statistical techniques for data processing.

#### Course Outcomes:

After completing the course, the students should be able to:

1. Develop a basic understanding of the Laplace and Fourier transformations
2. Apply random variable and probability distributions for different stochastic processes.
3. Evaluate data characteristics using statistical measures and techniques.
4. Compare and contrast different statistical tests for data evaluation.

#### Unit-I

**Laplace and Fourier Transform:** Laplace transformation and its properties, Unit – step, Impulse and Periodic functions; Fourier Transform, Fourier Sine and



Cosine Transform, Finite Sine and Cosine transform, Convolution theorem. Application of Fourier transform.

## **Unit-II**

**Random variables and probability distributions:** Conditional probability, Probability spaces, Discrete random variables, Independent random variables, Expectation of discrete random variables, Sums of independent random variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality, The multinomial distribution, Poisson approximation to the binomial distribution, Infinite sequences of Bernoulli trials, Continuous random variables and their properties, Distribution functions and densities, Normal, Exponential and Gamma densities, Conditional densities, Bayes' rule.

## **Unit-III**

**Basic Statistics: Measures of Central tendency:** Moments, Skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions; Correlation and regression - Rank correlation; Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.

## **Unit-IV**

**Applied Statistics:** Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations; Small samples: Test for single mean, difference of means and correlation coefficients; Test for ratio of variances - Chisquare test for goodness of fit and independence of attributes; T-test, Anova Test, F-Test.

### **Suggested Readings\*:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall.
3. S. Ross, A First Course in Probability, Pearson Education.
4. W. Feller, An Introduction to Probability Theory and its Applications, Wiley.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill Publishing Company Limited.

\*Latest Edition of the books to be followed.

## DATA STRUCTURES (DSC-6)

### FUNDAMENTALS OF COMPUTER PROGRAMMING

#### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Data Structures	4	3L	0T	1P	Class XII with Physics, Chemistry and Mathematics	NIL

**Course Hours: L: 03 T: 00 P: 02**

#### Course Objectives:

To understand and efficiently apply various data structures such as stacks, queues, linked lists, trees and graphs for solving various computing problems using C programming language.

#### Course Outcomes:

After completing the course, the students should be able to:

1. Develop skills to identify and determine the usage of various data structures, operations, associated algorithms and implement their applications.
2. Implement trees and graphs, and explain its applications.
3. Design and implement algorithms for searching and sorting.
4. Analyze efficiency of different algorithms using time and space complexity.

### **Unit-I**

**Simple Data Structures:** Arrays based Linear Data Structures: Array storage, sparse arrays; Transpose and addition of sparse matrices, Stacks and Queues and their applications, multiple stacks, and queues in an array.

### **Unit-II**

**Searching and Sorting:** Searching techniques: Linear and Binary, Sorting techniques: Selection, Bubble, Insertion, Merge sort, Quicksort; Complexity analysis; revision of Pointers and Dynamic Memory,

### **Unit-III**

**Linked Data Structures:** Singly, Doubly & Circular Linked Lists; representation, operations and applications, linked stacks and queues, linked lists based polynomial addition.

### **Unit-IV**

**Advanced Data Structures:** Trees, Basic concepts and definitions of a tree and binary tree and associated terminology, Binary tree traversal techniques, some more operations on binary trees, Heaps, and heapsort; Graphs: Terminology and Representations, Directed Graphs, Representation of graphs and their Transversal.

**Note:** The programming language to be used for teaching and implementation will be C. Course coordinator will prepare a list of experiments and lab manual for the Practicals covering the whole syllabus. Course coordinator will also prepare some mini projects to be done by the students utilizing various aspects of the subject & syllabus.

### **Suggested Readings\*:**

1. E Horowitz and S. Sahni: Fundamentals of Data Structures in C, Second Edition, Universities Press.
2. R.L. Kruse: Data Structures & Program Design in C, PHI.
3. D.F. Knuth: The Art of Computer Programming Vol-1, Narosa Publications.
4. Byron S. Gottfried: Theory and Problems of Programming with C Language, Schaum's Outlines Series, TMH.

\*Latest Edition of the books to be followed.

## **COMPUTER WORKSHOP (SEC-1)**

**Semester-I & II [Common to all branches]**

**Course Name – Computer Workshop**

**Course Credits: 0L-0T-2P**

**Course Hours: 0L+0T+4P**

**Pre-requisite: Nil**

**Course objectives:** Students of Computer Engineering are to work with various hardware and software not only in academia but also in the company. Thus, students should get familiar with various hardware, software, operating systems, and networking. This course will provide students a much-needed knowledge of computer hardware and networking, enabling them to identify and rectify onboard computer hardware, software, and network-related problems. With the help of this course, the student will be able to understand the hardware specifications that are required to run an operating system and various application programs.

**Course outcomes:** After completing their training in Computer Workshop, students will be able to

CO1. Describe the procedure for installation of software on different systems and identify the various components of hardware systems.

CO2. Identify and demonstrate components of computer and operating system and their troubleshooting.

CO3. Describe the basics of Internet and web design

CO4. Perform the process of software installation

### **Job 1. Assembly/Disassembly of Computers**

Hardware peripherals like RAM, ROM, input devices, output devices, processors, etc. Processors and processor core counts and frequency etc. motherboards, internal and external connectors. Types of data cables. LAN, Audio, and Video. The physical set-up of Printers- Scanner set-up, Webcam,

Bluetooth device, Memory card reader, etc. Working of SMPS. Connection of different types of devices to the ports (CPU), Single board computer: Raspberry Pi.

### **Job 2. Assembly/Dis-assembly of Laptop**

Mounting of processor. Fixing of the motherboard in the tower case. Connection to the power supply. Installation of drivers. Connection of cables. Mount the memory modules. Install the internal cards. Connection of the external devices and power.

### **Job 3. Computer Network Setup**

Networking components, devices, and tools; Preparing the network cables, network setup, configuration and management commands, Installation and configuration of network interface card and identification of MAC address. Sharing of resources

### **Job 4. Software Installations**

Installation of Windows Operating System, Types of software and their installations, some useful software (MS office, Adobe Acrobat, Google Chrome, VLC Media Player, LibreOffice, Win Rar)

### **Job 5. PC Maintenance**

POST (Power on Self-Test), identifying problems by Beep codes errors, checking power supply using Multi-meter, Replacement of components etc.

### **Job 6. Introduction to MS office**

Introduction to MS office - MS Word, MS PPT, MS Excel, Working with MS Word. MS Excel - Introduction to MS Excel, Basic computations, and calculations. Creation of slides including hyperlink, video, audio, and textual content.

### **Job 7. Tools for Online Teaching and Meetings**

Setting & troubleshooting of online meetings and video conferencing like google meet, zoom, Microsoft teams, Webex etc; use of google classroom and google forms for teaching, feedback, and evaluation.

**Job 8. Internet and Basic Webpage Design**

Searching the Internet, checking the speed of Internet connection, usage of E-Commerce, Creating webpage using HTML, CSS with static text, images, tables, audio, video etc and dynamic contents, animation usage and tools for webpages

**Job 9. AI & ML Applications:**

Case studies using module (Blackbox based) integration for AI & ML and its applications

Note: Workshop incharge may make additions or deletions in respect of above mentioned jobs as per the situation at any point of time.

**Electronics Workshop (SEC-2)**  
**Semester-I & II [Common to all branches]**

**Course Name-Electronics Workshop**

**Course Credits: 0L-0T-2P**

**Course Hours: 0L+0T+4P**

**Pre-requisite: Nil**

**Pre-requisite: Nil**

**Course objectives:** To impart practical knowledge to the students about electronic components, circuits, and electronic instruments. This course on Electronic Workshop will enable students to get a good opportunity for beginning their professional career even at the end of first year.

**Course outcomes:** After completing the course, the students should be able to:

CO1: Identify and troubleshoot various electronic components and instruments.

CO2: Differentiate between various ICs and PCBs

CO3: Disassemble a computer and identify various peripherals and internal circuit component.

CO4. Design and fabricate a product by building an actual power supply.

**Job1. Basic components used in the Electronics circuits**

- Identification of various components being used in any electronic circuit such as resistor, capacitor, various diodes (p-n junction, Zenner, LED), transistors (BJT, MOSFET, FET), breadboard, potentiometer.
- Learn graphical symbols used to represent the various components.
- Find the value of resistance, capacitance by its color code and value mentioned on the component.

**Job2. Instruments for measurement and analysis of Electronics circuits**

- Study the various controls on the panel of a typical CRO, Multimeter.
- Testing of components such as resistor, capacitor and transistor as PNP or NPN, Gain value of transistor, ensure the connectivity of their leads using multimeter.

- Perform small jobs as given by your instructor by using some of the above components and instruments.

### **Job3. Instruments for generating the signals for the electronic circuits**

- Study the various controls on the panel of a function generator and DC power supply.
- Using CRO and function generator perform jobs such as waveform analysis, Voltage measurement, frequency measurement, phase difference measurement etc.

### **Job4. Integrated circuits and (IC) tester**

- Study the pin configuration of a given IC number.
- Study the function of IC tester.
- Testing of IC on the IC tester.
- Verify the truth table of various logic gates by assembling them on the breadboard.
- Draw the Pin configuration of various logic gates in your file and record the observations of the truth table of these logic gates.

### **Job5. Transformer and soldering iron**

- Study the transformers used in the electronic circuits.
- Learn the precautions while using a soldering iron.
- Perform small jobs using soldering iron.

### **Job6. Printed circuit board**

- Learn to make a layout of electronic circuit using any PCB design software (OrCAD/TINA/ KiCAD/ DesignSpark PCB/ any other available software).
- Use of electronic components in the layout.
- Perform small jobs such as making a circuit on the PCB and learn soldering of components on PCB.
- Analysis of the designed circuit using CRO, Multimeter and signal generator.

### **Job7. Identification of various peripheral devices of computer**

- Learn to find complete specification of the given computer.
- Identify various peripheral devices including a keyboard, mouse, printer, and flash drive of a computer.

### **Job8. Assembling and disassembling of computer**

- Learn the precautions while disassembling of computer.



- Study of motherboard.
- Identification of various hardware peripherals like RAM, ROM and Processor.
- Study of various ports in a computer for interfacing with external hardware components.

#### **Job9. Product Development (Part 1)**

- Study the basic circuit of variable DC power supply.
- Procure all the components required to build a DC supply like transformer, diodes, capacitor, resistance, potentiometer, on/off switch etc. for given specifications of DC power supply.
- Test each component.
- Assemble it on breadboard and test its functionality.

#### **Job10. Product Development (Part 2)**

- Design a PCB for variable DC power supply designed in Job 9.
- Fabricate the variable DC power supply by assembling all the components on PCB and perform soldering.
- Test the fabricated variable DC Power supply.

Note: Workshop Incharge may make additions or deletions in respect of above-mentioned jobs as per the situation at any point of time.

## **ELECTRICAL WORKSHOP (SEC-3)**

**Semester-I & II [Common to all branches]**

**Course Name: Electrical Workshop**

**Course Credits: 0L-0T-2P**

**Course Hours: 0L+0T+4P**

**Pre-requisite: Nil**

**Course objectives:** In view of the multi exit facility to be provided to the students leaving after first year, this course on Electrical Workshop will enable such to get a good opportunity for beginning their professional career even at the end of first year.

**Course Outcomes:** After completing their training in Electrical Workshop, students will be able to

CO1. Differentiate the tools, recall their names and develop skill of using each one of these tools. They will also be able to describe the material and components used in House Wiring, get apprised of their names and use in the process of wiring.

CO2. Design various types of wirings and do actual wiring with his/her own hands. Students will also be able to explain the Energy Meter functions and make connections of energy meter and MCBs.

CO 3. Discuss the constructional details of DC and one type of single phase AC motor and maintain such items. Students will also be able to repair few house hold gadgets.

CO4. Design and fabricate the product by building an actual battery charger.

### **Job 1. Tools in the field of Electrical Engineering:**

- Gain awareness about various tools used in the field of Electrical Engineering and to learn the operation of each tool. Like: Vice, drill machine, hand grinder, combination pliers, screw driver set, wire stripper, tester, test lamp, multimeter, hammer, lug crimper, Soldering iron, hacksaw, different types of files.
- Perform small jobs as given by your instructor by using some of the above tools.

## **Job 2. House Wiring Materials:**

- Make a study of various components and material used in house wiring. Like: Aluminum and Copper wires of different specifications used in house wiring. Wooden boards and Bakelite sheets, wall mounted switch boxes and wiring plates, 2 pin, 3 pin, 5 pin wall sockets, power sockets, 2 pin, 3 pin & power plugs, iron and PVC conduits, bends, casing capping, junction boxes, Gang boxes, baton holder, pendant holder, bracket holder, angle holder, incandescent bulbs, LEDs, tube light strips, CFL, Indicator lamps. One way, 2 way and power switches. Isolators, MCBs, ELCBs and other materials.
- Practice fixing of switches and sockets in gang box.

## **Job 3. Performing, House wiring:**

- Study various types of house wiring techniques: Baton wiring, casing capping wiring, surface conduit wiring and concealed conduit wiring.
- Perform surface conduit wiring to accomplish stair case lighting.
- Prepare an extension board with following: Two 6A sockets with individual switches and individual indicators on an appropriate gang box.

## **Job 4. Electronic Energy Meter**

- Study the connections of Electronic Energy Meter. Assemble an MCB main board with a double pole MCB/isolator and 2 single pole MCBs and make connection with energy meter on one side and two load circuits on the other. Show operations of MCBs one by one.

## **Job 5. House hold Gadgets**

- Study the construction and operation of a heater, heat convactor, Electric iron, kitchen Mixer, soldering iron (depending upon time and availability this list can be modified).
- Assemble a heater from the available components. Operate it and measure its current, Voltage and Power.

## **Job 6. DC and Single phase AC Motors**

- Observe the given D.C. and single phase A.C. motors. Run them by connecting appropriate supply.

- Open the given D.C. Motor, observe its construction, do its servicing, clean its bearings and commutator. Reassemble and run it.
- Open the given A.C. motor, study its construction. Clean its bearing. Assemble it back and operate it. Measure its no load current.

### **Job 7. Ceiling Fans**

Study the construction and operation of a ceiling fan, Disassemble the given ceiling fan. Observe all its parts. Clean its bearings and other parts. Check the continuity of running and starting windings. Test the capacitor for its functionality. Assemble the fan back. Operate it by connecting to supply.

Reverse the direction of rotation by changing connection at the capacitor. Connect an electronic regulator and control its speed.

### **Job 8. Product Development (Part-1)**

- Study the circuit of a battery charger.
- Procure all the components required to build a charger like: Transformer, diodes, capacitor, voltmeter, ammeter, indicator, rotary switch, on/off switch, box connecting load. Test each component separately. (specification of charger will be given)
- Assemble bridge rectifier using 4 diodes.

### **Job 9. Product Development (Part-2)**

- Complete the testing of components procured in job 8.
- Fabricate the battery charger by assembling all the components procured and tested in job no. 8 (product development part-I) and wire it.
- Test the fabricated charger.

### **Job 10. Experience of Electronic Devices**

- Identify resistors, capacitors of various types and specifications
- Identify the given solid state devices like: diodes and transistors, SCR, Triac, Diac, few ICs of various specifications.
- Study the circuit of a solid state low rating voltage regulator.
- Assemble a voltage regulator and test it on fan and incandescent bulb. Or assemble a timer circuit using 555 IC.

Note: Workshop incharge may make additions or deletions in respect of above mentioned jobs as per the situation at any point of time.

## Details of areas for utilization of the fee/ fund:

Sl. No.	Particulars	Areas for utilization of the fee/fund
1.	Tuition Fee	As per existing norms
2.	University Student Welfare Fund	<ul style="list-style-type: none"> <li>• Cultural, Sports, Outreach and extension activities</li> <li>• NSS, NCC and other such activities</li> <li>• Field trips, excursions</li> <li>• University Internship</li> <li>• Research promotion and student internship</li> <li>• Medical Facilities</li> <li>• Training and Placement</li> <li>• Conference, Seminar and Workshop</li> <li>• Innovative Projects</li> <li>• Skill development activities</li> <li>• Annual meet</li> <li>• Facilities and services for the students with disabilities</li> <li>• Co-curricular and extra-curricular activities</li> <li>• Scholarship, Fellowships, Academic Awards and Incentives</li> <li>• Institutional development</li> <li>• Miscellaneous expenditure, if any, on unspecified items</li> </ul>
3.	Faculty / Department Student Welfare Fund and Service Charges	<ul style="list-style-type: none"> <li>• Cultural, Sports and Outreach and extension activities</li> <li>• NSS, NCC and other such activities</li> <li>• Field trips, excursions</li> <li>• Medical Facilities</li> <li>• Research promotion and student internship</li> <li>• Training and Placement</li> <li>• Conference, Seminar and Workshop</li> <li>• Innovative Projects</li> <li>• Skill development activities</li> <li>• Annual meet</li> <li>• Facilities and services for the students with disabilities</li> <li>• Co-curricular and extra-curricular activities</li> <li>• Scholarship, Fellowships, Academic Awards and Incentives</li> <li>• Institutional development</li> <li>• Miscellaneous expenditure, if any, on unspecified items</li> </ul>
4.	University Development Fund	<ul style="list-style-type: none"> <li>• Infrastructural activities such as construction of class room, laboratories, libraries and other essential construction etc. as required for the University</li> <li>• Instructional activities such as projectors, Lectern etc. and other ICT infrastructure</li> <li>• Upgradation of class rooms, laboratories, libraries etc.</li> </ul>

		<ul style="list-style-type: none"> <li>• Upgradation of technology such as computers, VPN connectivity, Wi-Fi, telecommunication, replacement of outdated computers, technical equipment for class rooms, libraries, offices, other supportive systems etc.</li> <li>• Repair/Renovation/Replacement/Upgradation of basic infrastructure of Halls, Hostels, Guest Houses, Existing Buildings, Roads, Water supply, Sewerage, STP, ETP &amp; other engineering works, Laboratory Equipment, Air-conditioning Plants, Machinery like lift, sub-station, generator, fire fighting system, audio-visual system, University vehicles etc.</li> <li>• Development of educational, intellectual and knowledge resources such as courseware, software and e-learning materials.</li> <li>• Extending the financial assistance to the colleges both for infrastructural and instructional development subject to availability of funds.</li> <li>• Granting of financial assistance to the teachers and officers towards travel grant for attending the international conference/seminar/workshop in abroad related to their academic/administrative activities/professional training</li> <li>• Student activities/Programmes such as Educational tour, Cultural activities, sports etc.</li> <li>• Human capital formation-academic and non-academic including payment of honorarium, wages for deployment of human resources for short term/seasonal and contractual basis</li> <li>• Temporary loan may be considered on case to case basis subject to recoupment, if there is a delay in releasing the grant by the funding agencies</li> <li>• Any other expenditure which may be considered essential for infrastructural and human development as approved by the Development Fund Committee</li> <li>• Miscellaneous expenditure, if any, on unspecified items</li> </ul>
5.	University Facilities and Services Charges	<ul style="list-style-type: none"> <li>• Upgradation, operation and maintenance of laboratories</li> <li>• Field work</li> <li>• Research activities</li> <li>• Automation and ICT infrastructure facilities and services</li> <li>• Training and placement</li> <li>• Upgradation, operation and maintenance of libraries</li> <li>• Creation and maintenance of buildings and other facilities</li> <li>• Support to Entrepreneurial activities and</li> </ul>

		providing funds to companies created by the University <ul style="list-style-type: none"> <li>• Awards</li> <li>• Payment to outsourcing agencies</li> <li>• Expenditure towards chemical and glassware</li> <li>• Subscription of e-journals and periodicals</li> <li>• Additional Resources</li> <li>• Payment to staff, both teaching and non-teaching</li> <li>• Expenditure towards payment of electricity, water and other statutory taxes</li> <li>• Expenditure on Non Collegiate Women Education Board (NCWEB) activities related to administrative activities and maintenance &amp; operation of various centres of NCWEB.</li> <li>• Hiring of vehicles</li> <li>• Miscellaneous expenditure, if any, on unspecified items</li> </ul>
6.	Faculty / Department Facilities and Services Charges	<ul style="list-style-type: none"> <li>• Upgradation, operation and maintenance of laboratories</li> <li>• Field work</li> <li>• Research activities</li> <li>• Automation and ICT infrastructure facilities and services</li> <li>• Training and Placement</li> <li>• Upgradation, operation and maintenance of libraries</li> <li>• Creation and maintenance of buildings and other facilities</li> <li>• Support to Entrepreneurial activities</li> <li>• Awards</li> <li>• Payment to outsourcing agencies</li> <li>• Expenditure towards chemical and glassware</li> <li>• Subscription of e-journals and periodicals</li> <li>• Additional Resources</li> <li>• Payment to staff, both teaching and non-teaching</li> <li>• Expenditure towards payment of electricity, water and other statutory taxes</li> <li>• Hiring of vehicles</li> <li>• Miscellaneous expenditure, if any, on unspecified items</li> </ul>
7.	Economically Weaker Section Support University Fund	For the students of the Economically Weaker Section
8.	Delhi University Students Union (DUSU) Fund	To meet out expenditure relative to DUSU activities in a manner as prescribed.

**Qualifications for the post of Assistant Professor in the disciplines of Science, Arts and Humanities relevant for appointment of Assistant Professors for the Department of Applied Sciences and Humanities under the Faculty of Technology of the University**

***Eligibility (A or B):***

**A.**

- 1) A Master's degree with 55% marks (or an equivalent grade in a point-scale wherever the grading system is followed) in a concerned/relevant /allied subject from an Indian University, or an equivalent degree from an accredited foreign University.
- 2) Besides fulfilling the above qualifications, the candidate must have cleared the National Eligibility Test (NET) conducted by the UGC or the CSIR (exemption from NET shall be granted in accordance with the following conditions.
  - (i) The National Eligibility Test (NET) shall be the minimum eligibility for appointment of Assistant Professor.

*Provided* that candidates who have been awarded a Ph.D. Degree in accordance with the University Grants Commission (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degree) Regulation, 2009, or the University Grants Commission (Minimum Standards and Procedure for



Award of M.Phil/Ph.D. Degree) Regulation, 2016, and their subsequent amendments from time to time, as the case may be, shall be exempted from the requirement of the minimum eligibility condition of NET for recruitment and appointment of Assistant Professor in the University.

*Provided* further that the award of degree to candidates registered for the M.Phil/Ph.D. programme prior to July 11, 2009, shall be governed by the provisions of the then existing Ordinances / Bye-laws / Regulations of the Institutions awarding the degree. All such Ph.D. candidates shall be exempted from the requirement of NET for recruitment and appointment of Assistant Professors in the University subject to the fulfillment of the following conditions:

- a) The Ph.D. degree of the candidate has been awarded in regular mode only;
- b) The Ph.D. thesis has been awarded by at least two external examiners;
- c) An open Ph.D. viva voce of the candidate has been conducted;
- d) The candidate has published two research papers from her/his Ph.D. work out of which at least one is in a refereed journal;
- e) The candidate has presented at least two papers, based on her/his Ph.D. work in conferences/seminars sponsored/ funded/supported by the UGC/ ICSSR/CSIR or any similar agency.

The fulfillment of these conditions is to be certified by the Registrar or the Dean (Academic Affairs) of the University concerned.

- (ii) The clearing of NET shall not be required for candidates in such disciplines for which NET has not been conducted.

Or

**B.**

The Ph.D. degree has been obtained from a foreign University/Institution with a ranking among top 500 in the world University ranking (at any time) by any one of the following: (i) Quacquarelli Symonds (QS) (ii) The Times Higher Education (THE) or (iii) The Academic Ranking Of World Universities (ARWU) of the Shanghai Jiao Tong University (Shanghai).