



# Vel Tech

Rangarajan Dr. Sagunthala  
R&D Institute of Science and Technology  
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

**Office of the Dean Research Studies**

**Minutes**

**of**

**21<sup>st</sup> Meeting of the Research Board**

Date: 10-07-2021

Time: 11.00 A.M

Venue: Video Conferencing Mode

(<https://meet.google.com/wvk-wyve-gca>)

  
Dr. S. Koteeswaran  
Dean Research Studies

**Vel Tech**  
Rangarajan Dr. Sagunthala  
R&D Institute of Science and Technology  
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Table 1: Details of applications received

Statistics of Ph.D. National Admission Summer Session 2021-22

| DEPARTMENT | Research Supervisor Vacancy | Application |             |                 | Entrance Exam  |                       | Mode of study |                    |                    | Male | Female |
|------------|-----------------------------|-------------|-------------|-----------------|----------------|-----------------------|---------------|--------------------|--------------------|------|--------|
|            |                             | Applied     | Shortlisted | Not Shortlisted | Exemption from | Eligible for Entrance | Full Time     | Part Time Internal | Part Time External |      |        |
| AERO       | 4                           | 7           | 7           | 0               | 0              | 7                     | 2             | 3                  | 2                  | 5    | 2      |
| AUTO       | 16                          | 2           | 2           | 0               | 0              | 2                     | 0             | 0                  | 2                  | 2    | 0      |
| CIVIL      | 13                          | 9           | 8           | 1               | 0              | 8                     | 5             | 0                  | 3                  | 4    | 4      |
| MECH       | 108                         | 13          | 11          | 2               | 0              | 11                    | 5             | 1                  | 5                  | 11   | 0      |
| IT         | 2                           | 1           | 1           | 0               | 0              | 1                     | 0             | 1                  | 0                  | 1    | 0      |
| CSE        | 73                          | 46          | 43          | 3               | 5              | 38                    | 6             | 12                 | 25                 | 28   | 15     |
| ECE        | 113                         | 35          | 35          | 0               | 1              | 34                    | 6             | 10                 | 19                 | 12   | 23     |
| EEE        | 5                           | 11          | 10          | 1               | 0              | 10                    | 4             | 4                  | 2                  | 4    | 6      |
| BIOTECH    | 24                          | 10          | 10          | 0               | 1              | 9                     | 9             | 0                  | 1                  | 4    | 6      |
| BIOMEDICAL | 11                          | 3           | 3           | 0               | 0              | 3                     | 2             | 0                  | 1                  | 1    | 2      |
| ENGLISH    | 5                           | 13          | 13          | 0               | 9              | 4                     | 6             | 0                  | 7                  | 6    | 7      |
| MATHS      | 73                          | 22          | 22          | 0               | 18             | 4                     | 11            | 2                  | 9                  | 8    | 14     |
| PHYSICS    | 60                          | 13          | 13          | 0               | 6              | 7                     | 7             | 0                  | 6                  | 11   | 2      |
| CHEMISTRY  | 52                          | 5           | 5           | 0               | 2              | 3                     | 3             | 0                  | 2                  | 4    | 1      |
| LAW        | 6                           | 12          | 6           | 6               | 0              | 6                     | 2             | 0                  | 4                  | 2    | 4      |
| MBA        | 5                           | 18          | 16          | 2               | 1              | 15                    | 10            | 0                  | 6                  | 6    | 10     |
| TOTAL      | 570                         | 220         | 205         | 15              | 43             | 162                   | 78            | 33                 | 94                 | 109  | 96     |

As per the recommendations of the scrutinizing committee and Ph.D. Regulations 2021, the applications listed in Table 2 are not considered for the Ph.D. Programme admissions for summer session of the Academic year 2021-22.

Table 2: Details of rejected applications

| S. No. | Application No | Name of the Candidate | Department | PG Name of the University              | UG Name of the university             | Mode of study applied | Remarks                                      |
|--------|----------------|-----------------------|------------|----------------------------------------|---------------------------------------|-----------------------|----------------------------------------------|
| 1      | VTDAS2100043   | G. B Subrahmanyam     | LAW        | Acharya Nagarjuna University           | Andhra University                     | Part Time External    | PG- Distance mode                            |
| 2      | VTDAS2100095   | Sandeep Kumar Mishra  | CSE        | Indira Gandhi National Open University | Bangalore University                  | Full Time             | PG- Distance mode                            |
| 3      | VTDAS2100061   | ChilampuChelvi        | CSE        | Mother Theresa University              | Bharathidasan University              | Part Time External    | PG- Distance mode                            |
| 4      | VTDAS2100150   | NallaRajasekhar       | LAW        | Acharya Nagarjuna University           | Andhra University                     | Full Time             | PG- Distance mode                            |
| 5      | VTDAS2100192   | AdapaSridevi          | LAW        | Acharya Nagarjuna University           | Andhra University                     | Part Time External    | PG- Distance mode                            |
| 6      | VTDAS2100305   | Jaishree.N            | LAW        | Annamalai University                   | Bangalore University                  | Part Time External    | PG- Distance mode                            |
| 7      | VTDAS2100535   | Balasubramaniam       | MBA        | Annamalai University                   | Madurai Kamaraj University            | Part Time External    | PG- Distance mode                            |
| 8      | VTDAS2100235   | Bhavidas C V          | Mechanical | Vinayaka Missions Research Foundation  | Vinayaka Missions Research Foundation | Full Time             | -                                            |
| 9      | VTDAS2100025   | Raksha Prakash        | LAW        | Karnataka State Law University         | Karnataka State Law University        | Part Time External    | PG- LL.M. – One Year Course                  |
| 10     | VTDAS2100344   | B. Sridhar            | MBA        | University of Madras                   | University of Madras                  | Full Time             | B.Com, M.Com Ph.D. Applied in MBA Department |
| 11     | VTDAS2100510   | Sherin Farhana        | LAW        | Christ University                      | Karnataka State Law University        | Full Time             | PG- LL.M. – One Year Course                  |

|    |              |                  |       |                                                              |                       |                    |                                           |
|----|--------------|------------------|-------|--------------------------------------------------------------|-----------------------|--------------------|-------------------------------------------|
| 12 | VTDAS2100612 | Balamurugan A G  | CSE   | Sathyabama University                                        | Anna University       | Part Time Internal | Less than one year experience in Vel Tech |
| 13 | VTDAS2100264 | Nasim Hosin      | Civil | Kalinga institute of industrial technology (kiit university) | Alfurat University    | Full Time          | International Candidate.                  |
| 14 | VTDAS2100115 | Ahmad E Delbi    | Mech  | Kalinga institute of industrial technology (KIIT university) | Aleppo University     | Full Time          | International Candidate.                  |
| 15 | VTDAS2100581 | M. Muthumanikkam | EEE   | Anna University                                              | Bharathiar University | Part Time External | Applied Twice                             |

As per the Clause 7.3 of Ph.D. Regulations [candidates with UGC/CSIR (JRF)/ NET/SLET/Teacher-Fellowship/ M.Phil/ other National level eligibility test may be exempted from written entrance examinations]. The following candidates listed in Table 3 are exempted from writing the Ph.D. Entrance Examination for the Ph.D. Admissions Summer Session 2021-22.

Table 3: Details of the applicants who are exempted from Entrance Examination.

| S.No. | Application No | Name of the Candidate | Eligibility Criteria | Department  | Mode of study applied | Valid score of any entrance exam |
|-------|----------------|-----------------------|----------------------|-------------|-----------------------|----------------------------------|
| 1     | VTDAS2100044   | Jeeva N               | M.Phil.              | Chemistry   | Part Time External    | NA                               |
| 2     | VTDAS2100097   | Ariyanatchi. M        | M.Phil.              | Mathematics | Full Time             | NA                               |
| 3     | VTDAS2100126   | C. Kowsalya           | M.Phil.              | Mathematics | Full Time             | NA                               |
| 4     | VTDAS2100121   | K. Srividya Lakshmi   | M.Phil.              | English     | Part Time External    | NA                               |
| 5     | VTDAS2100165   | Selvaraj S            | M.Phil.              | Mathematics | Full Time             | NA                               |
| 6     | VTDAS2100184   | Annai Delphin C       | M.Phil.              | Physics     | Part Time External    | NA                               |
| 7     | VTDAS2100273   | P. Hemalatha          | M.Phil.              | Mathematics | Part Time External    | NA                               |
| 8     | VTDAS2100212   | Anitha R              | M.Phil.              | Mathematics | Full Time             | NA                               |
| 9     | VTDAS2100358   | G Arunachala Boopathy | M.Phil.              | Mathematics | Full Time             | NA                               |
| 10    | VTDAS2100383   | R. Raju               | M.Phil.              | Mathematics | Part Time External    | NA                               |
| 11    | VTDAS2100420   | Reshika T             | M.Phil.              | English     | Full Time             | NA                               |
| 12    | VTDAS2100443   | B. Jothi              | M.Phil.              | CSE         | Full Time             | NA                               |
| 13    | VTDAS2100556   | Rohith. G             | M.Phil.              | Mathematics | Part Time Internal    | NA                               |
| 14    | VTDAS2100558   | Murugan R             | M.Phil.              | English     | Part Time External    | NA                               |
| 15    | VTDAS2100560   | Antony Prince P       | M.Phil.              | Mathematics | Full Time             | NA                               |
| 16    | VTDAS2100568   | Ramamoorthy           | M.Phil.              | Physics     | Part Time External    | NA                               |

|    |              |                           |           |             |                    |       |
|----|--------------|---------------------------|-----------|-------------|--------------------|-------|
| 17 | VTDAS2100580 | Devi Latha. S             | M.Phil.   | Mathematics | Part Time Internal | NA    |
| 18 | VTDAS2100307 | S. Selvi                  | M.Phil.   | Mathematics | Part Time External | NA    |
| 19 | VTDAS2100638 | Thiravidarani J           | M.Phil.   | Mathematics | Full Time          | NA    |
| 20 | VTDAS2100064 | Narasimmarao P V          | M.Phil.   | English     | Full Time          | NA    |
| 21 | VTDAS2100154 | V.Thennarasu              | M.Phil.   | Physics     | Part Time External | NA    |
| 22 | VTDAS2100163 | Muthukumari               | M.Phil.   | English     | Full Time          | NA    |
| 23 | VTDAS2100189 | Mohamed Yazer Arabath M   | M.Phil.   | Mathematics | Part Time External | NA    |
| 24 | VTDAS2100237 | Kirubai Nesam P           | M.Phil.   | CSE         | Full Time          | NA    |
| 25 | VTDAS2100244 | D. Jen Francis            | M.Phil.   | Mathematics | Part Time External | NA    |
| 26 | VTDAS2100446 | T. Nimalan.               | M.Phil.   | Physics     | Part Time External | NA    |
| 27 | VTDAS2100543 | K. Baskaran.              | M.Phil.   | English     | Part Time External | NA    |
| 28 | VTDAS2100562 | Venkatesan D              | M.Phil.   | English     | Part Time External | NA    |
| 29 | VTDAS2100566 | Manigandan M              | M.Phil.   | Physics     | Part Time External | NA    |
| 30 | VTDAS2100589 | Abirami S                 | M.Phil.   | Mathematics | Part Time External | NA    |
| 31 | VTDAS2100586 | Dinesh S                  | M.Phil.   | Mathematics | Full Time          | NA    |
| 32 | VTDAS2100594 | Gomathi V                 | M.Phil.   | Mathematics | Part Time External | NA    |
| 33 | VTDAS2100563 | Malarvili                 | M.Phil.   | CSE         | Part Time External | NA    |
| 34 | VTDAS2100517 | MuthuBhavani D R          | M.Phil.   | Mathematics | Part Time External | NA    |
| 35 | VTDAS2100617 | Paranthaman. S            | M.Phil.   | Chemistry   | Part Time External | NA    |
| 36 | VTDAS2100156 | S Swetha                  | NET       | ECE         | Part Time External | 172   |
| 37 | VTDAS2100456 | N Poornachandra Rao       | NET       | CSE         | Part Time External | 140   |
| 38 | VTDAS2100521 | Pushparaj P               | NET       | MBA         | Full Time          | 61.71 |
| 39 | VTDAS2100519 | ShanmugaPriya S           | UGC - NET | English     | Full Time          | 93.26 |
| 40 | VTDAS2100578 | Yeashisha Dincy A Vincent | NET       | English     | Full Time          | 94.19 |
| 41 | VTDAS2100584 | Jalampelli Thirupathi     | NET       | CSE         | Part Time External | 144   |
| 42 | VTDAS2100633 | Sathya Narayanan V        | GATE      | Biotech     | Full Time          | 46.67 |
| 43 | VTDAS2100008 | Madhavamoorthi S          | GATE      | Physics     | Full Time          | 32.3  |

\*NA – Not Applicable

**Action:**

After the discussion, 205 applications has been approved out of 220.

**Item No: 21.2 To consider the status of application received for the admission of Ph.D. Programme for International admissions of Summer Session of the Academic Year 2021- 22**

**Discussion:**

The Dean, Research Studies presented the details of applications received for Ph.D. Programme for International admissions of the Summer Session of the academic year 2021-22. The number of International applications received is 36 and the details are given in Table 4.

Table 4: Details of International applications received

**Statistics of Ph.D. International Admission Summer Session 2021-22**

| Department        | Research Supervisor Vacancy Positions | Application | Mode of study | Total     | Country           | Gender    |          |
|-------------------|---------------------------------------|-------------|---------------|-----------|-------------------|-----------|----------|
|                   |                                       | Applied     | Full Time     |           |                   | Male      | Female   |
| <b>AERO</b>       | 4                                     | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>AUTO</b>       | 16                                    | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>CIVIL</b>      | 13                                    | 2           | 2             | 2         | Syria             | 2         | 0        |
| <b>MECH</b>       | 108                                   | 5           | 5             | 5         | Syria             | 4         | 1        |
| <b>IT</b>         | 2                                     | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>CSE</b>        | 73                                    | 2           | 2             | 2         | Syria             | 1         | 1        |
| <b>ECE</b>        | 113                                   | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>EEE</b>        | 5                                     | 9           | 9             | 9         | Syria             | 7         | 2        |
| <b>BIOTECH</b>    | 24                                    | 2           | 2             | 2         | Syria             | 2         | 0        |
| <b>BIOMEDICAL</b> | 11                                    | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>ENGLISH</b>    | 5                                     | 1           | 1             | 1         | Syria             | 1         | 0        |
| <b>MATHS</b>      | 73                                    | 2           | 2             | 2         | Syria             | 2         | 0        |
| <b>PHYSICS</b>    | 60                                    | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>CHEMISTRY</b>  | 52                                    | 1           | 1             | 1         | Syria             | 1         | 0        |
| <b>LAW</b>        | 6                                     | 0           | 0             | 0         | -                 | 0         | 0        |
| <b>MBA</b>        | 5                                     | 12          | 12            | 12        | Syria             | 12        | 0        |
| <b>TOTAL</b>      | <b>570</b>                            | <b>36</b>   | <b>36</b>     | <b>36</b> | <b>Syria - 36</b> | <b>32</b> | <b>4</b> |

**Action:**

After the discussion in research board, all 36 applications are approved.

## **Items for Discussion**

**Item No: 21.3 To discuss and approve the Revised Ph.D. Coursework Syllabus.**

### **Discussion:**

The Ph.D. coursework syllabus for the course Research Methodology has been proposed for Engineering and Technology, Science & Humanities, MBA and LAW. The respective Dean proposed the revised syllabus. After the elaborative discussion, the members have suggested the following

#### **1. In Engineering and Technology syllabus:**

Machine Learning concepts and ANT colony Optimization may be included. Also the title of unit IV has been changed as Soft Computing instead of Optimization or Optimization Techniques in Soft Computing. The list of Reference books to be updated.

#### **2. In Science and Humanities Syllabus:**

The Syllabus content of three units may be common for all the Disciplines and it may be taken from Engineering and Technology syllabus content. Instead of practical, tutorial hours may be included. The Latex contents may be removed and instead quantitative methods may be included. From unit 5, first part of the contents may be removed.

#### **3. In Management Studies :**

The Syllabus content of three units may be common for all the Disciplines and it may be taken from Engineering and Technology syllabus content. Reference books to be updated with Year of Publication and Publisher.

#### **4. In Law:**

The proposed syllabus content may be considered and approved.

#### **Action:**

The syllabus content has been modified as per the suggestions and recommendation of the board.

The modified syllabus content are given below.

**(COMMON TO ALL ENGINEERING & TECHNOLOGY STREAMS)**

| <b>COURSE CODE</b> | <b>COURSE TITLE</b>         | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|--------------------|-----------------------------|----------|----------|----------|----------|
|                    | <b>RESEARCH METHODOLOGY</b> | <b>3</b> | <b>1</b> | <b>0</b> | <b>4</b> |

**Course Category:**

Research

**a. Preamble:**

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. Thus this syllabus is prepared to equip students with the basics of research methodology and also provide them acquaintance with the main ingredients of collection of data, analysis of data, quantitative methods, optimization IPR and report writing.

**b. Prerequisite Courses:**

This course has no prerequisites

**c. Related Courses:**

Basics of Research, Research Problem, Quantitative Methods in Research, Data Analysis

**d. Course educational objectives:**

To impart knowledge and skills required for research:

- Problem formulation, analysis and solutions.
- Technical paper writing / presentation without violating professional ethics
- Be able to read and interpret statistical information
- Know the basics of different evolutionary algorithms.
- Patent drafting and filing patents.

**e. Course Outcomes:**

Upon the successful completion of the course, students will be able to:

| <b>CO Nos.</b> | <b>Course Outcomes</b>                                                                                                                      | <b>Knowledge level<br/>(Based on revised<br/>Bloom's Taxonomy)</b> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| CO1            | Understand the concept / fundamentals of research and their types and ability to formulate research problem.                                | K2                                                                 |
| CO2            | Have adequate knowledge of measurement, scaling techniques as well as the quantitative and data analysis and hypothesis testing procedures. | K3                                                                 |
| CO3            | Demonstrate an ability to apply various statistical tools to solve research problem.                                                        | K3                                                                 |

|     |                                                                                      |    |
|-----|--------------------------------------------------------------------------------------|----|
| CO4 | Describe the basics of different evolutionary algorithms.                            | K3 |
| CO5 | Ability to understand about IPR and filing patents in R & D and Report Presentation. | K2 |

**f. Course Content**

**UNIT I – INTRODUCTION AND RESEARCH FORMULATION**

**L-9 + T-3**

**Introduction to Research:** Definitions and Characteristics of Research, Motivation and Objectives, Research Methods vs. Methodology. Types of Research: Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Concept of Applied and Basic Research Process, Criteria of Good Research.

**Defining and Formulating the Research Problem:** Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

**Literature Review:** Objectives of Review of Literature, Importance of Literature Review in Defining a Problem, Primary and Secondary Sources, Reviews, Treatise, Monographs, Patents, Web as a Source, Searching in the Web, Critical Literature Review, Identifying Gap Areas from Literature Review and Research Database, Development of Working Hypothesis.

**UNIT II – RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS**

**L-9 + T-3**

**Research Design:** Basic Principles, Need of Research Design, Features of Good Design, Different Research Designs, Experimental Designs, Research Databases, Development of Models, Developing a Research Plan, Exploration, Description, Diagnosis, and Experimentation.

**Data Collection and Analysis:** Primary and Secondary Data, Methods of Data Collection, Sampling Methods, Data Processing and Analysis Strategies and Tools, Data Analysis with Statistical Packages (Sigma STAT, SPSS for Student's t-test), Testing of Hypothesis (Student's t-test), ANOVA Technique.

**UNIT III – QUANTITATIVE METHODS FOR PROBLEM SOLVING**

**L-9 + T-3**

Basic Statistical Distributions and their Applications (No Derivations): Binomial, Poisson, Normal and their Applications in Research Studies. Fundamentals of Statistical Analysis and Inference, Multivariate methods, Concepts of Correlation and Regression Analysis, Fundamentals of Time Series Analysis and Spectral Analysis.

**UNIT IV – OPTIMIZATION TECHNIQUES IN SOFT COMPUTING**

**L-9 + T-3**

Optimization Definition, Need and Application, Formulation of Optimization Problems. Introduction to Evolutionary Algorithms, Fundamentals of Genetic Algorithms, Particle Swarm Optimization, Simulated Annealing, Introduction to Neural Networks, Neural Network Based Optimization, Introduction to Fuzzy Sets and Fuzzy Logic, Optimization of Fuzzy Logic.

**IPR:** Intellectual Property Rights and Patent Law, Commercialization, Copy Right, Royalty, Trade Related aspects of Intellectual Property Rights (TRIPS).

**Report Writing:** Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Oral Presentation, Design of Research Paper, Citation, Plagiarism, Basic Knowledge of funding agencies, Proposal Submission for Funding Agencies.

**g. Learning Resources**

**i. Reference Books:**

1. C.R. Kothari and Gaurav Garg, "Research Methodology: Methods and Techniques", New Age International (P) Ltd., Publishers, Fourth Multi Colour Edition, 2020.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical statistics, Sultan Chand & Sons, New Delhi, 12<sup>th</sup> Revised Edition, 2020.
3. Lawrence M. Leemis, Mathematical Statistics, Ascended Ideas, UK, 2020.
4. Paolo Brandimarte, Quantitative Methods: An Introduction for Business Management, John Wiley & Sons, 2011.
5. Sukanta Nayak, Fundamentals of Optimization Techniques with Algorithms, Academic Press, 2020.
6. Priya Rai, R.K. Sharma, P.K. Jain and Akash Singh, Transforming Dimension of IPR Challenges for New Age Libraries, National Law University Delhi Press, 2015.
7. Dr P M Bulakh, Dr P. S. Patki and Dr A S Chodhary, Research Methodology, Expert Trading Corporation Dahisar West, Mumbai, 2010.
8. Fink, A., Conducting Research Literature Reviews: From the Internet to Paper, Sage Publications, 5<sup>th</sup> edition, 2009.
9. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, An introduction to Research Methodology, RBSA Publishers, U.K., 2002.
10. Douglas C. Montgomery and George C. Runger. Applied Statistics and Probability for Engineers, 5<sup>th</sup> edition, John Wiley and Sons, Inc., New York, 2011.
11. Singiresu S. Rao, Engineering Optimization: Theory And Practice, New Age International Publishers, 5<sup>th</sup> edition 2020.
12. Panneerselvam, R. Research Methodology, PHI Publications, Second edition, 2014.
13. Jeannette Lawrence, Introduction to Neural Networks: Design, Theory, and Applications, California Scientific Software, sixth edition, 1994.
14. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley publications, 4th Edition, 2016.

**ii. Online resources:**

1. [https://www.soas.ac.uk/cedep-demos/000\\_P506\\_RM\\_3736-Demo/module/pdfs/p506\\_unit\\_01.pdf](https://www.soas.ac.uk/cedep-demos/000_P506_RM_3736-Demo/module/pdfs/p506_unit_01.pdf)
2. <https://repository.up.ac.za/bitstream/handle/2263/27704/01chapter1.pdf?sequence=2&isAllowed=y>
3. <http://egyankosh.ac.in/bitstream/123456789/41939/1/Unit-4.pdf>
4. <https://www.formpl.us/blog/data-collection-method>
5. <https://www.questionpro.com/blog/data-collection/>

6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4485510/>
7. <https://www.questionpro.com/blog/quantitative-research/>
8. [https://hls.harvard.edu/content/uploads/2011/12/quantitative\\_methods.pdf](https://hls.harvard.edu/content/uploads/2011/12/quantitative_methods.pdf)
9. <https://libguides.usc.edu/writingguide/quantitative>
10. <https://mech.iitm.ac.in/nspch52.pdf>
11. <https://www.kdd.org/kdd2016/topics/view/optimization-techniques>
12. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217699/>
13. <https://iare.ac.in/sites/default/files/M.Tech-RM%20%26%20IPR%20%28ECE%29%20PPTS.pdf>

**(SCIENCES AND HUMANITIES)**

| COURSE CODE | COURSE TITLE         | L | T | P | C |
|-------------|----------------------|---|---|---|---|
|             | RESEARCH METHODOLOGY | 3 | 1 | 0 | 4 |

**Course Category:**

Research

**a. Preamble:**

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. Thus this syllabus is prepared to equip students with the basics of research methodology and also provide them acquaintance with the main ingredients of collection of data, analysis of data, quantitative methods, optimization IPR and report writing.

**b. Prerequisite Courses:**

This course has no prerequisites

**c. Related Courses:**

Basics of Research, Research Problem, Quantitative Methods in Research and Data Analysis

**d. Course educational objectives:**

To impart knowledge and skills required for research:

- Problem formulation, analysis and solutions.
- Technical paper writing / presentation without violating professional ethics
- Be able to read and interpret statistical information
- Know the basics of different evolutionary algorithms.
- Patent drafting and filing patents.

**e. Course Outcomes:**

Upon the successful completion of the course, the students will be able to:

| CO Nos. | Course Outcomes                                                                                              | Knowledge level<br>(Based on revised<br>Bloom's Taxonomy) |
|---------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| CO1     | Understand the concepts /fundamentals of research and their types and ability to formulate research problem. | K2                                                        |

|     |                                                                                                                                             |    |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------|----|
| CO2 | Have adequate knowledge of measurement, scaling techniques as well as the quantitative and data analysis and hypothesis testing procedures. | K3 |
| CO3 | Demonstrate an ability to apply various statistical tools to solve research problem.                                                        | K3 |
| CO4 | Comprehend the fundamentals of mathematical and statistical analysis using software.                                                        | K3 |
| CO5 | Ability to understand about IPR and filing patents in R & D and Report Presentation.                                                        | K2 |

#### f. Course Content

### UNIT I – INTRODUCTION AND RESEARCH FORMULATION

L-9 + T-3

**Introduction to Research:** Definitions and Characteristics of Research, Motivation and Objectives, Research Methods vs. Methodology. Types of Research: Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Concept of Applied and Basic Research Process, Criteria of Good Research.

**Defining and Formulating the Research Problem:** Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

**Literature Review:** Objectives of Review of Literature, Importance of Literature Review in Defining a Problem, Primary and Secondary Sources, Reviews, Treatise, Monographs, Patents, Web as a Source, Searching in the Web, Critical Literature Review, Identifying Gap Areas from Literature Review and Research Database, Development of Working Hypothesis.

### UNIT II – RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS

L-9 + T-3

**Research Design:** Basic Principles, Need of Research Design, Features of Good Design, Different Research Designs, Experimental Designs, Research Databases, Development of Models, Developing a Research Plan, Exploration, Description, Diagnosis, and Experimentation.

**Data Collection and Analysis:** Primary and Secondary Data, Methods of Data Collection, Sampling Methods, Data Processing and Analysis Strategies and Tools, Data Analysis with Statistical Packages (Sigma STAT, SPSS for Student's t-test), Testing of Hypothesis (Student's t-test), ANOVA Technique.

### UNIT III–QUANTITATIVE METHODS

L-9 + T-3

Basic statistical distributions and their applications (**No Derivations**): Binomial, Poisson, Negative Binomial, Geometric, Normal, Log Normal, Exponential, Weibull and Gamma distributions and their applications in research studies - Correlation and Regression analysis.

### UNIT IV – COMPUTER APPLICATIONS

L-9 + T-3

Mathematical and Statistical analysis using software tools **MATLAB/SCILAB/SPSS/ R LANGUAGE**

Data preparation – Univariate analysis (frequency tables, bar charts, pie charts and percentages)

bivariate analysis – cross validation – Measures of central tendency – Dispersion – Correlation and Regression.

Introduction – Data files and types – Operations on matrix – M files – Loops and conditional operators – Functions – 2D and 3D plots.

## **UNIT V – IPR AND REPORT WRITING**

**L-9 + T-3**

**IPR:** Intellectual Property Rights and Patent Law, Commercialization, Copy Right, Royalty, Trade Related aspects of Intellectual Property Rights (TRIPS).

**Report Writing:** Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Oral Presentation, Design of Research Paper, Citation, Plagiarism, Basic Knowledge of funding agencies, Proposal Submission for Funding Agencies.

### **.Learning Resources**

#### **i. Text Books:**

1. C.R. Kothari and Gaurav Garg, " Research Methodology: Methods and Techniques", New Age International (P) Ltd., Publishers, Fourth Multi Colour Edition, 2020.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical statistics, Sultan Chand & Sons, New Delhi, 12th Revised Edition: 2020.
3. Lawrence Leemis, Mathematical Statistics, Ascended Ideas, UK, 2020.
4. Paolo Brandimarte, Quantitative Methods: An Introduction for Business Management, John Wiley & Sons, 2011.
5. Krishnamoorthy, K., 2015. A Handbook of Statistical Distributions with Applications, Chapman and Hall/CRC; 2nd edition.
6. Peter I. Kattan., 2010. MatLab for Beginners: A gentle approach, Creates pace Independent Pub; Revised edition.
7. Sandeep Nagar., 2017. Introduction to Scilab: For Engineers and Scientists, Apress; 1st edition.
8. Priya Rai, R.K. Sharma, P.K. Jain and Akash Singh, Transforming Dimension of IPR Challenges for New Age Libraries, National Law University Delhi Press, 2015.

#### **ii. Reference Books:**

1. Dr P M Bulakh, Dr P. S. Patki and Dr A S Chodhary, Research Methodology, Expert Trading Corporation Dahisar West, Mumbai ,2010.
2. Fink, A., Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications, 2009.
3. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, An introduction to Research Methodology, RBSA Publishers, U.K., 2002.
4. Douglas C. Montgomery and George C. Runger. Applied Statistics and Probability for Engineers, (3rdEdn), John Wiley and Sons, Inc., New York, 2003.

#### **iii. Online resources:**

1. [https://www.soas.ac.uk/cedep-demos/000\\_P506\\_RM\\_3736-Demo/module/pdfs/p506\\_unit\\_01.pdf](https://www.soas.ac.uk/cedep-demos/000_P506_RM_3736-Demo/module/pdfs/p506_unit_01.pdf)
2. <https://repository.up.ac.za/bitstream/handle/2263/27704/01chapter1.pdf?sequence=2&isAllowed=y>

3. <http://egyankosh.ac.in/bitstream/123456789/41939/1/Unit-4.pdf>
4. <https://www.formpl.us/blog/data-collection-method>
5. <https://www.questionpro.com/blog/data-collection/>
6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4485510/>
7. <https://www.questionpro.com/blog/quantitative-research/>
8. [https://hls.harvard.edu/content/uploads/2011/12/quantitative\\_methods.pdf](https://hls.harvard.edu/content/uploads/2011/12/quantitative_methods.pdf)
9. <https://libguides.usc.edu/writingguide/quantitative>
10. <https://mech.iitm.ac.in/nspch52.pdf>
11. <https://www.kdd.org/kdd2016/topics/view/optimization-techniques>
12. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217699/>
13. <https://iare.ac.in/sites/default/files/M.Tech-RM%20%26%20IPR%20%28ECE%29%20PPTS.pdf>

**(School of Management)**

| COURSE CODE | COURSE TITLE         | L | T | P | C |
|-------------|----------------------|---|---|---|---|
| 40210MG101  | RESEARCH METHODOLOGY | 3 | 1 | 0 | 4 |

**Course Category: Research**

**a. Preamble:**

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. Thus this syllabus is prepared to equip students with the basics of research methodology and also provide them acquaintance with the main ingredients of collection of data, analysis of data, quantitative methods, optimization IPR and report writing.

**b. Prerequisite Courses:**

This course has no prerequisites

**c. Related Courses:**

Basics of Research, Research Problem, Quantitative Methods in Research, Data Analysis

**d. Course educational objectives:**

To impart knowledge and skills required for research:

- Problem formulation, analysis and solutions.
- Technical paper writing / presentation without violating professional ethics
- Be able to read and interpret statistical information
- Know the basics of different evolutionary algorithms.
- Patent drafting and filing patents.

**e. Course Outcomes:**

Upon the successful completion of the course, students will be able to:

| CO Nos. | Course Outcomes                                                                                                                             | Knowledge level<br>(Based on revised Bloom's Taxonomy) |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| CO1     | Understand the concept / fundamentals of research and their types and ability to formulate research problem.                                | K2                                                     |
| CO2     | Have adequate knowledge of measurement, scaling techniques as well as the quantitative and data analysis and hypothesis testing procedures. | K3                                                     |
| CO3     | Demonstrate an ability to apply various univariate statistical tools to solve research problem.                                             | K3                                                     |
| CO4     | Demonstrate an ability to apply various bivariate and multivariate statistical tools to solve research problem.                             | K3                                                     |
| CO5     | Ability to understand about IPR and filing patents in R & D and Report Presentation.                                                        | K2                                                     |

#### f. Course Content

### UNIT I – INTRODUCTION AND RESEARCH FORMULATION

L-9 + T-3

**Introduction to Research:** Definitions and Characteristics of Research, Motivation and Objectives, Research Methods vs. Methodology. Types of Research: Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Concept of Applied and Basic Research Process, Criteria of Good Research.

**Defining and Formulating the Research Problem:** Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

**Literature Review:** Objectives of Review of Literature, Importance of Literature Review in Defining a Problem, Primary and Secondary Sources, Reviews, Treatise, Monographs, Patents, Web as a Source, Searching in the Web, Critical Literature Review, Identifying Gap Areas from Literature Review and Research Database, Development of Working Hypothesis.

### UNIT II – RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS

L-9 + T-3

**Research Design:** Basic Principles, Need of Research Design, Features of Good Design, Different Research Designs, Experimental Designs, Research Databases, Development of Models, Developing a Research Plan, Exploration, Description, Diagnosis, and Experimentation.

**Data Collection and Analysis:** Primary and Secondary Data, Methods of Data Collection, Sampling Methods, Data Processing and Analysis Strategies and Tools, Data Analysis with Statistical Packages (Sigma STAT, SPSS for Student's t-test), Testing of Hypothesis (Student's t-test), ANOVA Technique.

### UNIT III – STATISTICAL METHODS

L-9+T3

Measurement and scaling - Probability Distributions, Fundamentals of Statistical Analysis and Inference, Concepts of Parametric and Non parametric tests - Data Preparation – editing – Coding –Data

entry – Reliability and Validity of data – Univariate data analysis. Fundamentals of Time Series Analysis.

#### **UNIT IV–ICT IN RESEARCH**

**L-6+T-6**

Chi Square test, Independent sample t test, Paired sample t-test, factorial ANOVA, ANCOVA, MANOVA, correlation, partial correlation, regression, multiple regression, cluster analysis, discriminant analysis, factor analysis, correspondence, Structural Equation Modelling – Application of computer and statistical software for data analysis

#### **UNIT V – IPR AND REPORT WRITING**

**L-9 + T-3**

**IPR:** Intellectual Property Rights and Patent Law, Commercialization, Copy Right, Royalty, Trade Related aspects of Intellectual Property Rights (TRIPS).

**Report Writing:** Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Oral Presentation, Design of Research Paper, Citation, Plagiarism, Basic Knowledge of funding agencies, Proposal Submission for Funding Agencies.

**Total : 60 Periods**

#### **g. Learning Resources**

##### **i. Reference Books:**

1. C.R. Kothari and Gaurav Garg, "Research Methodology: Methods and Techniques", New Age International (P) Ltd., Fourth Multi Colour Edition, 2020.
2. Bajpai Naval, "Business Research Methods", Pearson Education, Second Edition, 2017.
3. Uma Sekaran and Roger Bougie, "Research methods for Business", Wiley India, New Delhi, Fifth Edition, 2012.
4. Garg.B.L., Karadia, R., Agarwal, F. and Agarwal, "An introduction to Research Methodology", RBSA Publishers, U.K., 2002.
5. S.C. Gupta and V.K. Kapoor, "Fundamentals of Mathematical statistics", Sultan Chand & Sons, New Delhi, Twelfth Revised Edition, 2020.
6. Paolo Brandimarte, "Quantitative Methods: An Introduction for Business Management", John Wiley & Sons, 2011.
7. Dr.P.MBulakh, Dr.P.S. Patki and Dr.A.S.Chodhary, "Research Methodology", Expert Trading Corporation, Dahisar West, Mumbai, 2010.
8. Fink.A, "Conducting Research Literature Reviews: From the Internet to Paper", Sage Publications, 2009.
9. Priya Rai, R.K. Sharma, P.K. Jain and Akash Singh, "Transforming Dimension of IPR Challenges for New Age Libraries", National Law University, Delhi Press, 2015.

**(School of Law)**

| COURSE CODE | COURSE TITLE         | L | T | P | C |
|-------------|----------------------|---|---|---|---|
| 4021PL001   | RESEARCH METHODOLOGY | 3 | 1 | 0 | 4 |

**Unit- I: Introduction**

**(L-9, T-3)**

Meaning of Research- Objectives of Research - Characteristics of Research- Nature of Science - Meaning of Scientific Method and its application in Social Research –Concepts –Theory- Hypothesis and Facts - Their nature and inter-relationship.

**Unit - II: Legal Research Methodology**

**(L-9, T-3)**

Meaning of Legal Research-Objective of Legal Research-Types of Legal Research (Descriptive, Quantitative, Qualitative, Analytical, Applied, Pure, Conceptual and Empirical Legal Research) -Steps involved in Legal Research - Methods of Legal Research - Doctrinal Legal Research- Characteristics; Non-Doctrinal Legal Research Features- Limitations- Comparative Research - Critical Research. .

**Unit - III: Type of Research Designs and Sampling**

**(L-9, T-3)**

(Explorative, Descriptive, Diagnostic, Analytical/Experimental)- Nature of Social Survey- Types of Surveys - Planning and Errors in Survey-Use of Sample-Type of Samples - Probability Samples and Non-Probability Samples-Methods of Data Collection; Interview Schedule-Questionnaire. Observation - Case Study. .

**Unit - IV: Research Design and Analysis**

**(L-9, T-3)**

Quantitative Methos, Research Design- Solutions of research problem-determination of research design - Research Tools. Classification and Tabulation - Use of Diagrammatic and Graphic Presentation - Computerized Research - Use of Computers in Legal Research- Reporting Writing in Legal Research - Book Review and Case Comments. Role of Bibliography. .

**Unit -V: Legal Writing**

**(L-9, T-3)**

Research Ethics,-Research Publication, Article writing in Legal Research-Use of definitions-maxims concepts-principles-Doctrines in Legal Research –Citations-Methodology-Book Review - Case Comments- Training infinal work..

**Books Referred:**

1. Goode and Hatt et.al. *Methods in Social Research*, Newyork Mec Grow Hills Publications Limited, 1962
2. Watt, Robert and Johns, *Francis, Concise Book on Legal Research*, Sydney, Federation Press, 2001
3. M.O. Price, H. Bitner and Bysiewiez, *Effective Legal Research* (1978)
4. Pauline V. Young & Schmid Calvin F., *Scientific Social Survey and Research* , Printice, New Delhi, (1968)
5. William J. Goode and Paul K.Hatt, *Methods in Social Research*, McGraw-Hill Book Company, London
6. Morris L.Cohan, *Legal Research in Nutshell*, (1996), West Publishing Co. Harvard Law Review Association, Uniform System of Citations.
7. Kothare, *Social Sciences Research*, New Delhi, 1968
8. ILI Publication, *Legal Research and Methodology*. Indian Law Institute, New Delhi.

**(COMMON TO ALL STREAMS)**

| <b>COURSE CODE</b> | <b>COURSE TITLE</b>                          | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|--------------------|----------------------------------------------|----------|----------|----------|----------|
|                    | <b>RESEARCH AND PUBLICATION ETHICS (RPE)</b> | <b>1</b> | <b>1</b> | <b>0</b> | <b>2</b> |

**Course Category:**

Research

**a. Preamble:**

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. The ethical pursuit of research in humanities, social sciences and other scientific disciplines is essential to the achievement of robust goals and research outcomes within the academe and it promotes systemic contributions in the field of advanced learning and knowledge generation.

**b. Prerequisite Courses:**

The course is primarily open to all PhD students.

**c. Related Courses:**

Research Ethics

**d. Course educational objectives:**

To impart knowledge and skills required for research:

- Provide students with the fundamental knowledge of basics of philosophy of science and ethics, research integrity, publication ethics.
- Hands-on sessions are designed to identify research misconduct and predatory publications.
- Indexing and citation databases, open access publications, research metrics (citations, hindex, Impact Factor etc).

**e. Course Outcomes:**

Upon the successful completion of the course, students will be able to:

| <b>CO Nos.</b> | <b>Course Outcomes</b>                                                                                                                       | <b>Knowledge level<br/>(Based on revised<br/>Bloom's Taxonomy)</b> |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| CO1            | To describe and apply theories and methods in ethics and research ethics.                                                                    | K2                                                                 |
| CO2            | To understand the philosophy of science and ethics, research integrity and publication ethics.                                               | K3                                                                 |
| CO3            | To acquire an overview of important issues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct. | K3                                                                 |
| CO4            | To understand indexing and citation databases, open access publications, research metrics (citations, h-index, impact Factor, etc.).         | K3                                                                 |
| CO5            | To acquire skills of presenting arguments and results of ethical inquiries and understand the usage of plagiarism tools.                     | K3                                                                 |
| CO6            | To understand the objectives of integrated library management system.                                                                        | K3                                                                 |

**f. Course Content**

**Unit I: PHILOSOPHY AND ETHICS (3 Hrs.)**

Introduction to philosophy: definition, nature and scope, concept, branches - Ethics: definition, moral philosophy, nature of moral judgments and reactions.

**Unit II: SCIENTIFIC CONDUCT (5 Hrs.)**

Ethics with respect to science and research - Intellectual honesty and research integrity - Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP) - Redundant Publications: duplicate and overlapping publications, salami slicing - Selective reporting and misrepresentation of data.

**Unit III: PUBLICATION ETHICS (7 Hrs)**

Publication ethics: definition, introduction and importance - Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. - Conflicts of interest - Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals - Predatory publisher and journals.

**Unit IV: OPEN ACCESS PUBLISHING (4 Hrs.)**

Open access publications and initiatives - SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies - Software tool to identify predatory publications developed by SPPU - Journal finger / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer, Journal Suggester, etc.

**Unit V: PUBLICATION MISCONDUCT (4Hrs.)**

Group Discussion (2 Hrs.) : a) Subject specific ethical issues, FFP, authorship b) Conflicts of interest c) Complaints and appeals: examples and fraud from India and abroad.

Software tools (2 Hrs.) : Use of plagiarism software like Turnitin, Urkund and other open source software tools.

**Unit VI: DATABASES AND RESEARCH METRICS (7Hrs.)**

Databases (4 Hrs): Indexing databases, Citation databases: Web of Science, Scopus, etc.

Research Metrics (3 Hrs.): Impact Factor of journal as per Journal Citations Report, SNIP, SJR, IPP, Cite Score - Metrics: h-index, g index, i10 Index, altmetrics.

**\*Units 1,2 and 3** are to be covered via Theory mode and Units 4,5 and 6 are to be covered via Tutorial practice mode.

**g. Learning Resources**

**i. Text Books:**

1. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity. 2007. Available at: <https://ori.hhs.gov/sites/default/files/rcrintro.pdf>.
2. P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865.

3. Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019). ISBN:978-81-939482-1-7. <http://www.insaindia.res.in/pdf/Ethics Book.pdf>.
4. Bird, A, Philosophy of Science. Routledge, . (2006).
5. The Student's Guide to Research Ethics By Paul Oliver Open University Press, 2003
6. Responsible Conduct of Research By Adil E. Shamoo; David B. Resnik Oxford University Press, 2003
7. Ethics in Science Education, Research and Governance Edited by Kambadur Muralidhar, Amit Ghosh Ashok Kumar Singhvi. Indian National Science Academy, 2019. ISBN: 978-81-939482-1-7.
8. Anderson B.H., Dursaton, and Poole M.: Thesis and assignment writing, Wiley Eastern, 1997.
9. Bijorn Gustavii: How to write and illustrate scientific papers? Cambridge University Press.
10. Bordens K.S. and Abbott, B.b.: Research Design and Methods, Mc Graw Hill, 2008
11. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press.
12. Resnik, D. B. (2011). What is ethics in research & why is it Important. National Institute of Environmental Health Sciences, 1-10. Retrieved from.
13. Graziano, A., M., and Raulin, M.,L.: Research Methods – A Process of Inquiry, Sixth Edition, Pearson, 2007.

## **ii. Reference Books:**

1. The Ethics of Teaching and Scientific Research By Miro Todorovich; Paul Kurtz; Sidney Hook.
2. Research Ethics: A Psychological Approach By Barbara H. Stanley; Joan E. Sieber; Gary B. Melton
3. Research Methods in Applied Settings: An Integrated Approach to Design and Analysis By Jeffrey A. Gliner; George A. Morgan Lawrence Erlbaum Associates, 2000
4. Ethics and Values in Industrial-Organizational Psychology By Joel Lefkowitz Lawrence Erlbaum Associates, 2003.

## **iii. Online resources:**

1. [https://www.enago.co.kr/academy/wp-content/uploads/2018/05/Research\\_Ethics.pub\\_V2.pdf](https://www.enago.co.kr/academy/wp-content/uploads/2018/05/Research_Ethics.pub_V2.pdf)
2. <https://www.frontiersin.org/about/policies-and-publication-ethics>
3. [https://www.researchgate.net/publication/340807930\\_RESEARCH\\_AND\\_PUBLICATION\\_ETHICS](https://www.researchgate.net/publication/340807930_RESEARCH_AND_PUBLICATION_ETHICS)
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5508450/>
5. <https://www.iieta.org/Journals/IJSDP/Publication%20Ethics%20and%20Malpractice%20Statement>
6. <http://ignca.gov.in/short-term-certification-course/research-and-publication-ethics/>

### **Items for Record**

#### **Item No: 21.4 To record the budget for the financial year 2021-22**

##### **Discussion:**

The Dean, Research Studies proposed the budget for the financial year 2021-22 as per the Table 5 given below.

Table 5: Budget for the financial year 2021-22

| S.No  | G Code  | Particulars                                                                                         | Budget 2021-22              | AnnexureDetails |
|-------|---------|-----------------------------------------------------------------------------------------------------|-----------------------------|-----------------|
|       |         |                                                                                                     | Proposed Budget 2021-22 (₹) |                 |
| 1     | G69.1.1 | DC/ RAC Members Remuneration [Review Meeting, Synopsis Meeting and Prior to Ph.D. Oral Examination] | 30,67,000                   | Annexure 1      |
| 2     | G69.1.2 | Incidental Charges                                                                                  | 3,39,000                    | Annexure 2      |
| 3     | G69.1.3 | Travelling Allowance                                                                                | 24,26,400                   | Annexure 3      |
| 4     | G69.1.4 | Full Time Scholars Stipend                                                                          | 2,21,85,000                 | Annexure 4      |
| 5     | G69.1.4 | Full Time Scholars Stipend with GATE/NET/SLET                                                       | 39,81,000                   | Annexure 4a     |
| 6     | G69.1.5 | Printing and Stationeries                                                                           | 50,000                      |                 |
| 7     | G69.1.6 | Miscellaneous                                                                                       | 50,000                      |                 |
| Total |         |                                                                                                     | 3,20,98,400                 |                 |

##### **Action:**

The members of the research board approved the budget for the financial year 2021-22.

#### **Item No: 21.5 To record Research Supervisor Vacancy positions for summer session of the Academic Year 2021-22.**

##### **Discussion:**

The Dean, Research Studies presented the research supervisor vacancy positions for summer session of the Academic Year 2021-22. As per the content given in the Table 6.

Table 6: Research Supervisor vacancy positions for summer session of the Academic Year 2021-22.

| DEPARTMENT | Research Supervisor Vacancy Positions |
|------------|---------------------------------------|
| AERO       | 4                                     |
| AUTO       | 16                                    |
| CIVIL      | 13                                    |
| MECH       | 108                                   |
| IT         | 2                                     |
| CSE        | 73                                    |
| ECE        | 113                                   |
| EEE        | 5                                     |
| BIOTECH    | 24                                    |
| BIOMEDICAL | 11                                    |
| ENGLISH    | 5                                     |
| MATHS      | 73                                    |
| PHYSICS    | 60                                    |
| CHEMISTRY  | 52                                    |
| LAW        | 6                                     |
| MBA        | 5                                     |
| TOTAL      | 570                                   |

**Action:**

The members of the research board approved the item.

**Item No : 21.6 To record the status of the Research Scholars who are not eligible to continue as per the Regulations.**

**Discussion:**

The Dean, Research Studies presented the status of the Research Scholars who are not eligible to continue as per the Regulations and as given in the Table 7.

Table 7: The status of the Research Scholars who are not eligible to continue as per the Regulations.

| Sl. No. | VTD No. | Register Number | Name of the Research Scholar | Research Scholar Department | Name of the Research Supervisor | Research Supervisor Contact No | Research Supervisor Department | Date of Admission (DD/MM/YYYY) | Year and Month of Admission | Batch No. | Semester No. | Mode of Study (FULL TIME/ PT - INTERNAL/ PT-EXT(GI)) |
|---------|---------|-----------------|------------------------------|-----------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|-----------|--------------|------------------------------------------------------|
| 1       | 258     | 13RECS1047      | Emmanuel Rajarathnam         | CSE                         | Dr N R Rajalakshmi              | 9003183172                     | CSE                            | 6/5/2013                       | 13-May                      | 14        | 16           | PT-EXTERNAL                                          |
| 2       | 334     | 14RHEG1002      | S Prabhakarn                 | ENGLISH                     | Dr M R Bindhu                   | 9940377731                     | ENGLISH                        | 11/10/2014                     | 14-Oct                      | 20        | 14           | PT-EXTERNAL                                          |
| 3       | 357     | 15RHCH1001      | Sreeram Thanesh              | CHEMISTRY                   | Dr C Hazarathaiyah Yadav        | 8056224558                     | CHEMISTRY                      | 8/8/2015                       | 15-Aug                      | 23        | 12           | PT-EXTERNAL                                          |
| 4       | 419     | 17REEE1002      | H Sudheer Kumar              | EEE                         | Dr P K Dhal                     | 9884123207                     | EEE                            | 11/2/2017                      | 17-Feb                      | 29        | 9            | PT-EXTERNAL                                          |
| 5       | 479     | 17RECV1004      | Veerakumar R                 | CIVIL                       | Dr S Samson                     | 9940796020                     | CIVIL                          | 4/6/2017                       | 17-Jun                      | 30        | 8            | PT-INTERNAL                                          |
| 6       | 489     | 17RECE1033      | Sathyasujith                 | ECE                         | Dr Sasikala                     | 8610651649                     | ECE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 7       | 504     | 17RECS1026      | Dudekulakullay Shareef       | CSE                         | Dr M Shyamala Devi              | 9962028328                     | CSE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 8       | 506     | 17RECS1034      | Nagaram Phani Kumar          | CSE                         | Dr Thanga Mariappan L           | 9566866210                     | CSE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 9       | 508     | 17RECE1021      | Kandula Ramarao              | ECE                         | Dr P Suresh                     | 9940186845                     | ECE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 10      | 563     | 17RECV1007      | Iswarya D                    | CIVIL                       | Dr S. Kandasamy                 | 8190965230                     | CIVIL                          | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 11      | 574     | 18RHEG1001      | Ahalya Kalluri               | ENGLISH                     | Dr M R Bindhu                   | 9940377731                     | ENGLISH                        | 24/01/2018                     | 18-Jan                      | 32        | 7            | PT-EXTERNAL                                          |
| 12      | 625     | 18RECE1010      | A Yogaraj                    | ECE                         | Dr H K Shingh                   | 9677189160                     | ECE                            | 25/06/2018                     | 18-Jun                      | 33        | 6            | PT-EXTERNAL                                          |
| 13      | 637     | 19RECS1010      | Rupavathy N                  | CSE                         | Dr J Visumathi                  | 9884398548                     | CSE                            | 20/12/2018                     | 18-Dec                      | 34        | 5            | PT-INTERNAL                                          |
| 14      | 643     | 19RECS1007      | O Rajitha                    | CSE                         | Dr R Kavitha                    | 9840219515                     | CSE                            | 20/12/2018                     | 18-Dec                      | 34        | 5            | PT-EXTERNAL                                          |
| 15      | 647     | 19RECS1006      | L Lanuwabang                 | CSE                         | Dr Logesh R                     | 9486453607                     | CSE                            | 20/12/2018                     | 18-Dec                      | 34        | 5            | PT-EXTERNAL                                          |
| 16      | 648     | 19RECS1013      | T Kavitha                    | CSE                         | Dr R Kavitha                    | 9840219515                     | CSE                            | 20/12/2018                     | 18-Dec                      | 34        | 5            | PT-EXTERNAL                                          |
| 17      | 673     | 19RHMA1003      | Ilavaraja Mp                 | MATHS                       | Dr M.L. Suresh                  | 9444116609                     | MATHS                          | 20/12/2018                     | 18-Dec                      | 34        | 5            | PT-EXTERNAL                                          |
| 18      | 685     | 19REAE1002      | Poonuri Anudeep              | AERO                        | Dr N Dillip Raja                | 9884590601                     | MECH                           | 10/7/2019                      | 19-Jul                      | 35        | 4            | PT-EXTERNAL                                          |
| 19      | 734     | 19RECV1012      | Veludurthi Manojkumar        | CIVIL                       | Dr E B Perumal Pillai           | 9994620925                     | CIVIL                          | 24/8/2019                      | 19-Aug                      | 35        | 4            | PT-EXTERNAL                                          |
| 20      | 807     | 20RECS1014      | Batoul Aljaddouh             | CSE                         | Dr K Meena                      | 9940840274                     | CSE                            | 6/10/2020                      | Oct-20                      | 37        | 2            | FULL TIME                                            |
| 21      | 811     | 20REAE1003      | Manoj Mahore                 | AERO                        | Dr R Jaganraj                   | 8148928522                     | AERO                           | 23/09/2020                     | 20-Sep                      | 37        | 2            | PT-EXTERNAL                                          |
| 22      | 861     | 20RHMA1006      | Madhusudhan R M              | MATHS                       | Dr T.Gunasekar                  | 9543343390                     | MATHS                          | 23/09/2020                     | 20-Sep                      | 37        | 2            | FULL TIME                                            |
| 23      | 871     | 20RHLW1010      | M. Sathish Rayan             | LAW                         | Dr A Subrahmanyam               | 9440315993                     | LAW                            | 24/09/2020                     | 20-Sep                      | 37        | 2            | PT-EXTERNAL                                          |
| 24      | 873     | NC              | Anatol                       | CIVIL                       | Dr S Samson                     | 9940796020                     | CIVIL                          | 10/1/2021                      | Jan-20                      | 37        | 3            | FULL TIME                                            |
| 25      | 877     | NC              | J M Nazeer                   | CSE                         | Dr N R Rajalakshmi              | 9789991173                     | CSE                            | 10/1/2020                      | Jan-20                      | 37        | 3            | FULL TIME                                            |
| 26      | 410     | 16RECS1003      | Londhe Aoudumber Dattatray   | CSE                         | Dr Logesh R                     | 9486453607                     | CSE                            | 12/11/2016                     | 16-Nov                      | 28        | 10           | PT-EXTERNAL                                          |
| 27      | 526     | 17RECS1036      | Ritesh Sukhadev Dayama       | CSE                         | Dr Logesh R                     | 9486453607                     | CSE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 28      | 529     | 17RECS1025      | Digambar Yalappa Yedage      | CSE                         | Dr Logesh R                     | 9486453607                     | CSE                            | 20/09/2017                     | 17-Sep                      | 31        | 8            | PT-EXTERNAL                                          |
| 29      | 369     | 16RECV1002      | Vignesh J                    | CIVIL                       | Dr S. Kandasamy                 | 8190965230                     | CIVIL                          | 14/05/2016                     | 16-May                      | 26        | 10           | PT-EXTERNAL                                          |
| 30      | 872     | NC              | Gemeda                       | CIVIL                       | Dr S. Kandasamy                 | 8190965230                     | CIVIL                          | 10/1/2020                      | Jan-20                      | 37        | 3            | FULL TIME                                            |

#### Action:

The members recommended the Cancellation.

**Item No 21.7 To record the Revised Schedule of Ph.D. entrance examination and interview for the Summer Session of the Academic Year 2021-22.**

#### Discussion:

The Dean, Research Studies presented the Revised Schedule of Ph.D. entrance examination and interview for the Summer Session of the Academic Year 2021-22 and is given in Table 8.

Table 8: The Revised Schedule of Ph.D. entrance examination and interview for the Summer Session of the Academic Year 2021-22.

| Batch          | Month & Year | Issue of Application | Last Date for Submission of Application | Entrance Examination     | Interview                | Certificate Verification and Admission |
|----------------|--------------|----------------------|-----------------------------------------|--------------------------|--------------------------|----------------------------------------|
| Summer Session | July 2021    | 25.03.2021           | 31.05.2021<br>20.06.2021                | 18.06.2021<br>10.07.2021 | 26.06.2021<br>24.07.2021 | 10.07.2021<br>14.08.2021               |
| Winter Session | January 2022 | 01.10.2021           | 05.11.2021                              | 11.12.2021               | 17.12.2021               | 08.01.2022                             |

#### Action:

The members of the research board approved the item.

## Item for Ratification

**Item No: 21.8 To ratify the Provisionally Admitted Candidates for the Ph.D. Programme in Winter Session of the Academic Year 2020-21.**

### **Discussion:**

The Dean, Research Studies presented the details to ratify the Provisionally Admitted Candidates for the Ph.D. Programme in Winter Session of the Academic Year 2020-21 as given in Table 9 and 10

**Table 9: Statistics of Ph.D. National Admission Winter Session AY 2020-21**

| Statistics of Ph.D. National Admission Winter Session AY 2020-21 |             |             |                 |                              |                            |                           |             |                        |                    |                    |       |        |        |
|------------------------------------------------------------------|-------------|-------------|-----------------|------------------------------|----------------------------|---------------------------|-------------|------------------------|--------------------|--------------------|-------|--------|--------|
| DEPARTMENT                                                       | Application |             |                 | Entrance Exam                |                            | Interview                 |             | Provisionally Admitted |                    |                    | Total | Gender |        |
|                                                                  | Applied     | Shortlisted | Not Shortlisted | Exemption from Entrance Exam | Eligible for Entrance Exam | Shortlisted for interview | Shortlisted | Full Time              | Part Time Internal | Part Time External |       | Male   | Female |
| AERO                                                             | 6           | 6           | 0               | 1                            | 5                          | 5                         | 1           | 1                      | 0                  | 1                  | 2     | 2      | 0      |
| AUTO                                                             | 4           | 4           | 0               | 0                            | 4                          | 3                         | 2           | 1                      | 0                  | 0                  | 1     | 1      | 0      |
| CIVIL                                                            | 14          | 14          | 0               | 0                            | 14                         | 11                        | 6           | 1                      | 2                  | 2                  | 5     | 5      | 0      |
| MECH                                                             | 29          | 29          | 0               | 1                            | 28                         | 20                        | 15          | 1                      | 7                  | 2                  | 10    | 8      | 2      |
| IT                                                               | 0           | 0           | 0               | 0                            | 0                          | 0                         | 0           | 0                      | 0                  | 0                  | 0     | 0      | 0      |
| CSE                                                              | 36          | 36          | 0               | 8                            | 28                         | 31                        | 21          | 3                      | 4                  | 6                  | 13    | 7      | 6      |
| ECE                                                              | 32          | 32          | 0               | 0                            | 32                         | 28                        | 22          | 2                      | 11                 | 9                  | 22    | 11     | 11     |
| EEE                                                              | 13          | 13          | 0               | 0                            | 13                         | 11                        | 7           | 1                      | 2                  | 2                  | 5     | 2      | 3      |
| BIOTECH                                                          | 5           | 5           | 0               | 3                            | 2                          | 5                         | 3           | 3                      | 0                  | 0                  | 3     | 0      | 3      |
| BIOMEDICAL                                                       | 0           | 0           | 0               | 0                            | 0                          | 0                         | 0           | 0                      | 0                  | 0                  | 0     | 0      | 0      |
| ENGLISH                                                          | 12          | 12          | 0               | 9                            | 3                          | 11                        | 3           | 3                      | 0                  | 0                  | 3     | 1      | 2      |
| MATHS                                                            | 13          | 11          | 2               | 6                            | 5                          | 11                        | 4           | 3                      | 0                  | 1                  | 4     | 0      | 4      |
| PHYSICS                                                          | 2           | 2           | 0               | 0                            | 2                          | 1                         | 1           | 0                      | 0                  | 0                  | 0     | 0      | 0      |
| CHEMISTRY                                                        | 6           | 6           | 0               | 0                            | 6                          | 4                         | 2           | 0                      | 0                  | 0                  | 0     | 0      | 0      |
| LAW                                                              | 4           | 4           | 0               | 1                            | 3                          | 4                         | 1           | 0                      | 0                  | 0                  | 0     | 0      | 0      |
| MBA                                                              | 8           | 8           | 0               | 3                            | 5                          | 6                         | 2           | 0                      | 1                  | 1                  | 2     | 1      | 1      |
| TOTAL                                                            | 184         | 182         | 2               | 32                           | 150                        | 151                       | 90          | 19                     | 27                 | 24                 | 70    | 38     | 32     |

**Table 10: Statistics of Ph.D. International Admission Winter Session AY 2020-21**

| Statistics of Ph.D. International Admission Winter Session AY 2020-21 |             |             |                 |                           |             |                        |       |                         |        |        |
|-----------------------------------------------------------------------|-------------|-------------|-----------------|---------------------------|-------------|------------------------|-------|-------------------------|--------|--------|
| Department                                                            | Application |             |                 | Interview                 |             | Provisionally Admitted | Total | Country                 | Gender |        |
|                                                                       | Applied     | Shortlisted | Not Shortlisted | Shortlisted for interview | Shortlisted | Full Time              |       |                         | Male   | Female |
| AERO                                                                  | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| AUTO                                                                  | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| CIVIL                                                                 | 2           | 2           | 0               | 2                         | 2           | 2                      | 2     | Syria                   | 1      | 1      |
| MECH                                                                  | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| IT                                                                    | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| CSE                                                                   | 3           | 3           | 0               | 3                         | 1           | 1                      | 1     | Syria                   | 1      | 0      |
| ECE                                                                   | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| EEE                                                                   | 1           | 1           | 0               | 1                         | 1           | 1                      | 1     | Syria                   | 1      | 0      |
| BIOTECH                                                               | 1           | 1           | 0               | 1                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| BIOMEDICAL                                                            | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| ENGLISH                                                               | 1           | 1           | 0               | 1                         | 1           | 1                      | 1     | Syria                   | 0      | 1      |
| MATHS                                                                 | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| PHYSICS                                                               | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| CHEMISTRY                                                             | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| LAW                                                                   | 0           | 0           | 0               | 0                         | 0           | 0                      | 0     | -                       | 0      | 0      |
| MBA                                                                   | 2           | 2           | 0               | 2                         | 2           | 2                      | 2     | Syria & Rwanda          | 1      | 1      |
| TOTAL                                                                 | 10          | 10          | 0               | 10                        | 7           | 7                      | 7     | Syria - 6<br>Rwanda - 1 | 4      | 3      |

### **Action:**

This item is ratified.

**Item No: 21.9 To ratify the decision taken on Research Supervisor Recognition to the faculty members from various Departments**

**Discussion:**

The list of faculty members who have submitted the applications for research supervisor recognition Dean, Research Studies presented to consider for Supervisorship to guide the Ph.D. scholars. The details of the submitted applications are given below in Table 11.

Table 11: Status of applications for supervisorship

| S. No | Research Supervisor No | Name of the Research Supervisor | Dept. | Designation         | Year of Awarded | Scopus (No.of Publications as 1st Author / Total No.of Publications) | Remarks  |
|-------|------------------------|---------------------------------|-------|---------------------|-----------------|----------------------------------------------------------------------|----------|
| 1     | 32419.CV.21            | Dr J Logeshwari                 | Civil | Assistant Professor | 2017            | 3/3                                                                  | Eligible |
| 2     | 32555.CS.21            | Dr Saira Banu                   | CSE   | Associate Professor | 2018            | 2/4                                                                  | Eligible |
| 3     | 32656.CS.21            | Dr N Vijayaraj                  | CSE   | Associate Professor | 2020            | 2/8                                                                  | Eligible |
| 4     | 32739.EC.21            | Dr Sathyasri B                  | ECE   | Associate Professor | 2020            | 6/8                                                                  | Eligible |
| 5     | 32840.EC.21            | Dr S Vijayalakshmi              | ECE   | Assistant Professor | 2019            | 4/11                                                                 | Eligible |
| 6     | 32941.EC.21            | Dr Bharanidharan N              | ECE   | Assistant Professor | 2020            | 8/21                                                                 | Eligible |
| 7     | 33042.EC.21            | Dr M Saravanan                  | ECE   | Assistant Professor | 2020            | 10/19                                                                | Eligible |
| 8     | 33115.BS.21            | Dr J Naresh Kumar               | Maths | Associate Professor | 2018            | 3/8                                                                  | Eligible |
| 9     | 33216.BS.21            | Dr J Senbagamalar               | Maths | Assistant Professor | 2014            | 2/5                                                                  | Eligible |
| 10    | 33317.BS.21            | Dr S P Niranjana                | Maths | Assistant Professor | 2018            | 4/8                                                                  | Eligible |

**Action:**

As per the guidelines of Ph.D. Regulations, the applications from S.No 1 to 10 are approved. This item is ratified.

**Any other Items:****Item No21.10: Eligibility Criteria for Ph.D. Programme - M.S. Degree Duration (1 Year, 1.5 Year).****Discussion**

The members have discussed regarding the Eligibility Criteria for Ph.D. Programme, whether to consider the M.S. Degree with the duration of 1 Year and 1.5 Year. After the discussion, all the members have suggested to consider the duration of 1.5 years as a special case for this session and it is has been proposed to place this matter to the board before the admission in future.

**Action:**

The research board has recommended 1.5 year duration of M.S degree may be considered as special case. Also, in future, if any candidate applied for Ph.D. Programme with less than 2 years of M.S. degree, it must be presented to the Research Board for further discussion and approval.

**Item No 21.11: Ph.D. Thesis Evaluation Panel Members (The thesis shall be evaluated by his/ her Research Supervisor and two external adjudicator's one from India and another from outside Country)****Discussion**

The members have discussed regarding the Ph.D. Thesis Evaluation, whether the Research supervisor shall be considered as one of the adjudicator in addition to Indian and Foreign adjudicators. The members have suggested adding Research Supervisor as one of the Adjudicators in addition to Indian and Foreign adjudicators.

**Action:**

As per the Regulations (VTR16) and UGC Regulations, the Research supervisor shall be considered as one of the adjudicator in addition to Indian and Foreign adjudicators.

**Item No 21.12: Request Received from the following Research Scholars Regarding Scopus Indexed Publications****Discussion**

The Dean, research studies presented the details about the request received from the following Research Scholars regarding their Scopus Indexed Publications

VTD 542 - P. Revathi – English Department – 09 Publications

VTD 126 - Harish K A – MBA Department – 03 Publications

**Action:**

The above listed research scholars may be considered as special case. In future also, any candidate requesting for publication issue may be presented in the Research Board for further discussion and approval.

**Item No 21.13: Dormant Research Scholars Not Registered for the Winter Session of the AY 2020-21.**

**Discussion**

The Dean, research studies presented the details regarding the Dormant Research Scholars

**Action:**

The research scholars those who have not registered and not submitted the Semester Progress Report for the Winter Session of the AY 2020-21 recommended to move under the Dormant Category.