



PhD (Electrical Engineering)

Ordinances, Scheme and Syllabus



(U/S 2(f) and 12B of the UGC Act 1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: PhD

Vision of the Department:

To produce dynamic, competent, knowledgeable electrical engineers who shall lead a Nation to a better future by establishing the strong teaching and research environment.

Mission of the Department:

M1: To provide our students an education of the highest quality.

M2: To promote excellence in teaching, research, consultancy activities and positive contribution to the society.

M3: To create and sustain an environment of learning in which students transform theory into practice with due consideration of ethical and economic issues

M4: To prepare our students for life-long learning to meet intellectual, ethical and career challenges.

Program Educational Objectives (PEO's):

PEO1: Encourage to develop start-up companies developing Electrical Engineering equipment's/appliances/machines to contribute to the society

PEO2: Graduates will be able to communicate effectively, adopt lifelong learning, act with Integrity and have inter-personal skills needed to engage in, lead and nurture diverse teams, with commitment to their ethical and social responsibilities.

PEO3: To train students of Electrical Engineering program who can contribute to teaching profession, research & development by pursuing higher studies.

Program Specific Outcomes (PSO's):

PSO1: To model, analyze, design, and realize physical systems, components or processes related to high current electrical engineering systems.

PSO2: To carry out research /investigation independently to solve practical problems.

Program Outcomes:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, Simulation tools, modern techniques and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Independently carry out research /investigation and development work to solve practical problems related to Electrical Engineering.

PO3: Design & Development of solutions: To design and develop a system to meet desired needs within social areas such as economics, environmental, and ethics.

PO4: Conduct investigations of complex problems: To work upon unfamiliar problems through investigative studies and research and contribute to the development of technological knowledge and intellectual property.

PO5: Modern tool Usage: Apply appropriate methodology and modern engineering/IT tools to meet the international standards in the area of Electrical Engineering

PO6: 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

PO7: 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.

PO8: Ethics: Acquire integrity and ethics of research to execute projects efficiently.

PO9: Individual and Team Work: Recognize the need for lifelong learning & research independently, with a high level of enthusiasm, commitment and accuracy to improve knowledge and competence continuously

PO10: 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.

PO11: Project management and finance: Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

PO12: Life-long learning: Design one system for Electrical Engineering efficient system and make project report for its concept to implementation based on learnings above.



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DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: PhD

Short title, Application and Commencement:

These Regulations may be called University Grants Commission (Minimum Standards and Procedure for Award of M.Phil /Ph.D. Degrees) Regulations, 2016.

They shall apply to every University established or incorporated by or under a Central Act, a Provincial Act, or a State Act, every affiliated college, and every Institution Deemed to be a University under Section 3 of UGC Act, 1956.

They shall come into force from the date of their publication in the Gazette of India.

Eligibility criteria for admission to the PhD programme:

Subject to the conditions stipulated in these Regulations, the following persons are eligible to seek admission to the Ph.D programme:

Master's Degree holders satisfying the criteria stipulated under Clause 2 above.

Candidates who have cleared the M.Phil. course work with at least 55% marks in aggregate or its equivalent grade 'B' in the UGC 7-point scale (or an equivalent grade in a point scale wherever grading system is followed) and successfully completing the M.Phil. Degree shall be eligible to proceed to do research work leading to the Ph. D. Degree in the same Institution in an integrated programme. A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/differently-abled and other categories of candidates as per the decision of the Commission from time to time.

A person whose M.Phil. Dissertation has been evaluated and the viva voce is pending may be admitted to the Ph.D programme of the same Institution;

Candidates possessing a Degree considered equivalent to M.Phil. Degree of an Indian Institution, from a Foreign Educational Institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions, shall be eligible for admission to Ph.D programme.

Duration of the Programme:

M.Phil. programme shall be for a minimum duration of two (2) consecutive semesters / one year

and a maximum of four (4) consecutive semesters/ two years.

Ph.D. programme shall be for a minimum duration of three years, including course work and a maximum of six years.

Extension beyond the above limits will be governed by the relevant clauses as stipulated in the Statute/Ordinance of the individual Institution concerned.

The women candidates and Persons with Disability (more than 40% disability) may be allowed a relaxation of one year for M.Phil and two years for Ph.D. in the maximum duration. In addition, the women candidates may be provided Maternity Leave/Child Care Leave once in the entire duration of M.Phil /Ph.D. for up to 240 days.

Procedure for admission:

All Universities and Institutions Deemed to be Universities shall admit M.Phil /Ph.D. students through an Entrance Test conducted at the level of Individual University/Institution Deemed to be a University. The University/Institution Deemed to be a University may decide separate terms and conditions for Ph.D. Entrance Test for those students who qualify UGC-NET (including JRF)/UGC-CSIR NET (including JRF)/SLET/GATE/teacher fellowship holder or have passed M.Phil programme. Similar approach may be adopted in respect of Entrance Test for M.Phil programme.

Higher Educational Institutions (HEIs) referred to in sub-clause 1.2 above and Colleges under them which are allowed to conduct M.Phil. and/or Ph.D. programmes, shall:

Decide on an annual basis through their academic bodies a predetermined and manageable number of M.Phil. and/or Ph.D. scholars to be admitted depending on the number of available Research Supervisors and other academic and physical facilities available, keeping in mind the norms regarding the scholar- teacher ratio (as indicated in Para 6.5), laboratory, library and such other facilities; notify well in advance in the institutional website and through advertisement in at least two (2) national newspapers, of which at least one (1) shall be in the regional language, the number of seats for admission, subject/discipline-wise distribution of available seats, criteria for admission, procedure for admission, examination centre(s) where entrance test(s) shall be conducted and all other relevant information for the benefit of the candidates; adhere to the National/State-level reservation policy, as applicable. The admission shall be based on the criteria notified by the Institution, keeping in view the guidelines/norms in this regard issued by the UGC and other statutory bodies concerned, and taking into account the reservation policy of the Central /State Government from time to time. HEIs as mentioned in Clause 1.2 shall admit candidates by a two-stage process through:

An Entrance Test shall be qualifying with qualifying marks as 50%. The syllabus of the Entrance Test shall consist of 50% of research methodology and 50% shall be subject specific. The Entrance Test shall be conducted at the Centre(s) notified in Advance (changes

of Centres ,if any, also to be notified well in advance)at the level of the individual HEI as mentioned in clause 1.2; and An interview/*viva-voce* to be organized by the HEI as mentioned in clause 1.2 when the candidates are required to discuss their research interest/area through a presentation before a duly constituted Department Research Committee. The interview/*viva voce* shall also consider the following aspects, viz. whether:

The candidate possesses the competence for the proposed research;
The research work can be suitably undertaken at the Institution/College;
The proposed area of research can contribute to new/additional knowledge.

The University shall maintain the list of all the M.Phil. / Ph.D. registered students on its website on year-wise basis. The list shall include the name of the registered candidate, topic of his/her research, name of his/her supervisor/co-supervisor, date of enrolment/registration.

Allocation of Research Supervisor:

Eligibility criteria to be a Research Supervisor ,Co-Supervisor, Number of M.Phil. /Ph.D. scholars permissible per Supervisor, etc.

Any regular Professor of the University/Institution Deemed to be a University/College with at least five research publications in refereed journals and any regular Associate/Assistant Professor of the university /institution deemed to be a university/college with a Ph.D. degree and at least two research publications in refereed journals maybe recognized as Research Supervisor.

Provided that in areas/disciplines where there is no or only a limited number of refereed journals, the Institution may relax the above condition for recognition of a person as Research Supervisor with reasons recorded in writing.

Only a fulltime regular teacher of the concerned University/Institution Deemed to be a University/College can act as a supervisor. The external supervisors are not allowed. However, Co-Supervisor can be allowed in inter-disciplinary areas from other departments of the same institute or from mother related institutions with the approval of the Research Advisory Committee.

The allocation of Research Supervisor for a selected research scholar shall be decided by the Department concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors and research interests of the scholars as indicated by them at the time of interview/*viva voce*

In case of topics which are of inter-disciplinary nature where the Department concerned feels that the expertise in the Department has to be supplemented from outside, the Department may appoint a Research Supervisor from the Department itself, who shall be

known as the Research Supervisor, and a Co-Supervisor from outside the Department/Faculty/College/Institution on such terms and conditions as maybe specified and agreed upon by the consenting Institutions/Colleges.

A Research Supervisor/Co-supervisor who is a Professor, at any given point of time, cannot guide more than three (3) M.Phil. and Eight (8) Ph.D. scholars. An Associate Professor as Research Supervisor can guide up to a maximum of two (2) M.Phil. and six (6) Ph.D. scholars and an Assistant Professor as Research Supervisor can guide upto a maximum of one (1)M.Phil. and four(4)Ph.D.scholars.

In case of relocation of an M.Phil /Ph.D. woman scholar due to marriage or otherwise, the research data shall be allowed to be transferred to the University to which the scholar intends to relocate provided all the other conditions in these regulations are followed in letter and spirit and the research work does not pertain to the project secured by the parent institution/supervisor from any funding agency.The scholar will however give due credit to the parent guide and the institution for the part of research already done.

Course Work: Credit Requirements, number, duration ,syllabus, minimum standards for completion, etc.

The credit assigned to the M.Phil. or Ph.D. course work shall be a minimum of 08 creditsand amaximum of 16credits.

The course work shall be treated as prerequisite for M.Phil./Ph.D. preparation. A minimum of four credits shall be assigned to one or more courses on Research Methodology which could cover areas such as quantitative methods, computer applications , research ethics and review of published research in the relevant field, training, field work, etc. Other courses shall be advanced level courses preparing the students for M.Phil./Ph.D .degree.

All courses prescribed for M.Phil. and Ph.D. course work shall be in conformity with the credit hour instructional requirement and shall specify content ,instructional and assessment methods. They shall be duly approved by the authorized academic bodies.

The Department where the scholar pursues his/her research shall prescribe the course(s) to him/her based on the recommendations of the Research Advisory Committee, as stipulated under sub-Clause8.1below, of the research scholar.

All candidates admitted to the M.Phil. and Ph.D. programmes shall be required to complete the coursework prescribed by the Department during the initial one or two semesters.

Candidates already holding M. Phil. degree and admitted to the Ph.D. programme, or

those who have already completed the course work in M.Phil. and have been permitted to proceed to the Ph.D. in integrated course, may be exempted by the Department from the Ph.D. course work. All other candidates admitted to the Ph.D. programme shall be required to complete the Ph.D. course work prescribed by the Department.

Grades in the course work, including research methodology courses shall be finalized after a combined assessment by the Research Advisory Committee and the Department and the final grades shall be communicated to the Institution/College.

A M.Phil./Ph.D. scholar has to obtain a minimum of 55% of marks or its equivalent grade in the UGC7-point scale (or an equivalent grade/CGPA in a point scale wherever grading system is followed) in the coursework in order to be eligible to continue in the programme and submit the dissertation/thesis.

Research Advisory Committee and its functions:

There shall be a Research Advisory Committee, or an equivalent body for similar purpose as defined in the Statutes/Ordinances of the Institution concerned, for each M.Phil. and Ph.D. scholar. The Research Supervisor of the scholar shall be the Convener of this Committee. This Committee shall have the following responsibilities:

- To review the research proposal and finalize the topic of research;

- To guide the research scholar to develop the study design and methodology of research and identify the course(s) that he/she may have to do.

- To periodically review and assist in the progress of the research work of the research scholar.

A research scholar shall appear before the Research Advisory Committee once in six months to make a presentation of the progress of his/her work for evaluation and further guidance. The six monthly progress reports shall be submitted by the Research Advisory Committee to the Institution/College with a copy to the research scholar.

In case the progress of the research scholar is unsatisfactory, the Research Advisory Committee shall record the reasons for the same and suggest corrective measures. If the research scholar fails to implement these corrective measures, the Research Advisory Committee may recommend to the Institution/College with specific reasons for cancellation of the registration of the research scholar.

Evaluation and Assessment Methods, minimum standards/credits for award of the degree,etc.:

The overall minimum credit requirement, including credit for the course work, for the award of M.Phil. degree shall not be less than 24 credits.

Upon satisfactory completion of coursework ,and obtaining the marks /grade prescribed in sub-clauses 7.8 above,as the case maybe ,the M.Phil./Ph.D .scholar shall be required to undertake research work And produce a draft dissertation/thesis within a reasonable time ,as stipulated by the Institution concerned based on these Regulations.

Prior to the submission of the dissertation/thesis,the scholar shall make a presentation in the Department before the Research Advisory Committee of the Institution concerned which shall also be open to all faculty members and other research scholars. The feedback and comments obtained from them may be suitably incorporated into the draft dissertation/thesis in consultation with the Research Advisory Committee.

M.Phil scholars shall present at least one (1) research paper in a conference/seminar and Ph.D. scholars must publish at least one (1) research paper in refereed journal and make two paper presentations in conferences/seminars before the submission of the dissertation/thesis for adjudication, and produce evidence for the same in the form of presentation certificates and/or reprints. The Academic Council (or its equivalent body) of the Institution shall evolve a mechanism using well developed software and gadgets to detect plagiarism and other forms of academic dishonesty. While submitting for evaluation, the dissertation/thesis shall have an undertaking from the research scholar and a certificate from the Research Supervisor attesting to the originality of the work, vouching that there is no plagiarism and that the work has not been submitted for the award of any other degree/diploma of the same Institution where the work was carried out, or to any other Institution.

The M.Phil dissertation submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least one external examiner who is not in the employment of the Institution/ College. The *viva-voce* examination, based among other things, on the critiques given in the evaluation report, shall be conducted by both of them together, and shall be open to be attended by Members of the Research Advisory Committee, all faculty members of the Department, other research scholars and other interested experts/ researchers.

The Ph.D. thesis submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least two external examiners, who are not in employment of the Institution/College, of whom one examiner may be from outside the country. The *viva- voce* examination, based among other things, on the critiques given in the evaluation report, shall be conducted by the Research Supervisor and at least one of the two external examiners, and shall be open to be attended by Members of the Research Advisory Committee, all faculty members of the Department other research scholars and other interested experts/researchers.

The public *viva-voce* of the research scholar to defend the dissertation/thesis shall be conducted only if the evaluation report(s) of the external examiner(s) on the dissertation/thesis is/are satisfactory and include a specific recommendation for conducting the *viva-voce* examination. If the evaluation report of the external examiner in case of M.Phil. dissertation, or one of the evaluation reports of the external examiner in case of Ph.D. thesis, is unsatisfactory and does not recommend *viva-voce*, the Institution shall send the dissertation/thesis to another external examiner out of the approved panel of examiners and the *viva-voce* examination shall be held only if their report of the latest examiner is satisfactory. If the report of the latest examiner is also unsatisfactory, the dissertation/thesis shall be rejected and the research scholar shall be declared ineligible for the award of the degree.

The Institutions shall develop appropriate methods so as to complete the entire process of evaluation of M.Phil. dissertation/ Ph.D. thesis within a period of six months from the date of submission of the dissertation/thesis.

Academic, administrative and infrastructure requirement to be fulfilled by Colleges for getting recognition for offering M.Phil./Ph.D programmes:

Colleges may be considered eligible to offer M.Phil./Ph.D programmes only if they satisfy the availability of eligible Research Supervisors, required infrastructure and supporting administrative and research promotion facilities as per these Regulations.

Postgraduate Departments of Colleges, Research laboratories of Government of India /State Government with at least two Ph.D. qualified teachers/scientists/other academic staff in the Department concerned along with required infrastructure, supporting administrative and research promotion facilities as per these Regulations, stipulated under sub-clause 10.3, shall be considered eligible to offer M.Phil./Ph.D programmes. Colleges should additionally have the necessary recognition by the Institution under which they operate to offer M.Phil./Ph.D programme.

Colleges with adequate facilities for research as mentioned below alone shall offer M.Phil./Ph.D programmes:

In case of science and technology disciplines exclusive research laboratories with sophisticated equipment as specified by the Institution concerned with provision for adequate space per research scholar along with computer facilities and essential software, and uninterrupted power and water supply;

earmarked library resources including latest books, Indian and International journals, e-journals, extended working hours for all disciplines, adequate space for research scholars in the

Department/library for reading, writing and storing study and research materials; Colleges may also access the required facilities of the neighbouring Institutions/Colleges, or of those Institutions/Colleges/R&D laboratories/Organizations which have the required facilities.

Treatment of Ph.D/M.Phil through Distance Mode/Part-time:

Notwithstanding anything contained in these Regulations or any other Rule or Regulation, for the time being in force, no University; Institution, Deemed to be a University and College shall conduct M.Phil.and Ph.D.Programmes through distance education mode.

Part-time Ph.D will be allowed provided all the conditions mentioned in the extant Ph.D Regulations are met.

Award of M.Phil./Ph.D.degrees prior to Notification of these Regulations, or degrees awarded by foreign Universities:

Award of degrees to candidates registered for the M.Phil./Ph.D. programme on or after July 11, 2009 till the date of Notification of these Regulations shall be governed by the provisions of the UGC (Minimum Standards and procedure for Awards of M.Phil/Ph.D Degree) Regulation,2009.

If the M.Phil./Ph.D.degree is awarded by a Foreign University ,the Indian Institution considering such a degree shall refer the issue to a Standing Committee constituted by the concerned institution for the purpose of determining the equivalence of the degree awarded by the foreign University.

Depository with INFLIBNET:

Following the successful completion of the evaluation process and before the announcement of the award of the M.Phil./Ph.D. degree(s), the Institution concerned shall submit an electronic copy of the M.Phil. dissertation /Ph. D. thesis to the INFLIBNET, for hosting the same so as to make it accessible to all Institutions/Colleges.

Prior to the actual award of the degree,the degree-awarding Institution shall issue a provisional Certificate to the effect that the Degree has been awarded in accordance with the provisions of these UGC Regulations,2016.



(U/S 2(f) and 12B of the UGC Act 1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: PhD

Course Work

Subject Code	Name of Subject	External	Internal	Total
MPhD-101	Research Methodology	60	40	100
MPhD- 136	Power System Protection	60	40	100
RPE-102	Research Publications and Ethics	60	40	100
Total		180	120	300

Subject Code: MPhD-101

Name of Subject: Research Methodology

L	T	P
4	0	0

Course Outcomes:

CO1: Able to select and define appropriate research problem and Parameters.

CO2: Able to select the data from different methods.

CO3: Able to organize and conduct research in a more appropriate manner.

CO4: Able to understand and apply statistical.

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	S	M	M	M	W	W	M	S	M
CO2	S	S	S	S	M	M	M	W	W	M	S	M
CO3	S	S	M	S	M	M	M	W	W	M	S	M
CO4	S	S	M	S	S	M	M	W	W	M	S	M

Unit	Course Outlines	Hour(s)
Unit -I	Research: Definition, Meaning, Purpose, Types of Research, Research Approaches: Quantitative & Qualitative, Significance of Research, Parameters and Variables in Research, Identification, Selection and Formulation of Research Problem, Research Design: Meaning & Types.	12
Unit -II	Sampling Theory: Types of Sampling, Steps in Sampling, Sampling & Non- Sampling errors, Determination of Sample Size. Data for Research, Primary and Secondary Data: Methods of data collection- Primary and Secondary Data. Data Processing, Editing, Coding, Quantitative and Qualitative Data, Analysis Techniques.	13

Unit -III	Literature Review: Its need and significance in Research, Sources of Literature Review, APA & MLA styles of Thesis writing, Meaning of Bibliography/References, Plagiarism. Synopsis: Steps involved in writing synopsis, Norms and standards in writing Research Papers, Report writing, Pagination, Footnotes.	11
Unit -IV	Statistical Inferences: Estimation & Hypothesis Testing, Type I & Type II Error, Parametric and Non Parametric Tests (Chi square test, z test, F test, Student t-test, Mann Whitney test, ANOVA (one way, two way), Computer Applications: MS Excel & SPSS for data analysis.	9

Recommended Books:

1. Kothari, CR, Research Methodology- Methods and Techniques, New Age International Publishers, New Delhi.
2. Dash, Priyaranjan, Research Methodology with SPSS, Varinda Publications (P) Ltd.
3. Gupta, S.P Gupta, M.P. Business Statistics, Sultan Chnad& Sons
4. Chandan, J.S. Singh. J, Khanna, K.K. Business Statistics, Vikas Publishing House Pvt. Ltd.
5. Hooda, R.P. Statistics for Business and Economics, Macmillan India limited, New Delhi.

Subject Code: MPhD-136

Name of Subject: Power System Protection

L	T	P
4	0	0

Course Outcomes:

At the end of the course, students should be able to

CO1: Able to understand the basic components of power system protection system

CO2: Analyze performance and operating characteristics of substation, isolator, fuses, relays and circuit breakers.

CO3: Select and design protection system of Bus bar, Generator and Transformer

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	S	M	S	M	W	W	W	W	M	M
CO2	M	S	M	M	W	M	M	W	M	M	W	S
CO3	M	M	S	S	W	M	M	W	M	W	W	S

Unit	Course Outlines	Hour(s)
Unit -I	Introduction: Types of relays, their classifications and theory Phase and amplitude comparators. Static Comparators Computer Applications to protective relaying, Symmetrical and Unsymmetrical faults in the power system, Advantages of Per Unit methods, Load factor, Diversity factor, power factor, Methods of Power factor improvement. Hydro power plant, Thermal power plant, Hydro power plant, advantages, disadvantages and comparison between them.	12

Unit -II	Transmission Line Protection: Carrier Current Protection. Applications of microwave Channels for protective relaying, Selection of suitable static relaying, scheme for transmission line protection. Performance specifications of distance relays, effect of fault resistance and effects of power swings on operation of relays. Distance relay settings. Requirement of Characteristic for different zeros. Selection of suitable static relaying schemes for transmission lines.	13
Unit -III	Generators and Transformers Protection: CT's and PTs burden and accuracy and their connections. Protection of rotor winding. miscellaneous protection schemes for generators and transformers, Overfluxing protection of transformers. Differential Relays: Operating Characteristics, Restraining Characteristics, Analysis of Electromagnetic and differential Static relays schemes.	11
Unit -IV	Bus zone Protection: Types of bus bar, Advantages and Disadvantages Of Bus Bar, Protection requirements, protection schemes and modern trend in bus-bar protection. Circuit Breakers: Physical stress in circuit breakers, Vacuum circuit breakers, SF6 Circuit breakers Direct current C.B's, Short circuit testing of circuit breakers. Comparison of different types of circuit breakers.	9

Recommended Books:

1. T.S. Madhava Rao, Power System Protection (Static Relays), Tata McGraw-Hill, 1989.
2. A.R. Van C. Warrington, Protective Relays, Chapman and Hall London, 1968.
3. S.K. Basu and S. Chaudhary, Power System Protection, Raju Primlan Oxford and IBH Press 1983.
4. Ravindra Nalh M. Chander, Power System Protection and Switch Gear, John Wiley Eastern 1989.
5. Sunil S. Rao. Power System Protection and Switch Gear, Khanna Publishers 1989. Related IEEE/IEE Publications.

Subject Code: RPE-102

Name of Subject: Research Publications and Ethics

L	T	P
4	0	0

Course Outcomes:

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

CO1: Understand the philosophy of science and ethics, research integrity and publication ethics.

CO2: Identify research misconduct and predatory publications.

CO3: Understand indexing and citation databases, open access publications, research metrics (citations, h- index, impact Factor, etc.).

CO4: Understand the usage of plagiarism tools.

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	M	M	W	S	M	S	M	S
CO2	S	S	M	M	M	M	W	S	M	S	M	S
CO3	S	S	M	M	S	M	M	S	S	S	S	S
CO4	S	W	M	M	M	M	M	S	M	S	M	S

Unit	Course Outlines	Hour(s)
Unit -I	<p>Philosophy And Ethics: Introduction to philosophy: definition, nature and scope, concept, branches - Ethics: definition, moral philosophy, nature of moral judgements and reactions.</p> <p>Scientific Conduct: 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.</p>	15
Unit -II	<p>Publication Ethics: 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 behavior and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals – Predatory publisher and journals.</p> <p>Open Access Publishing : 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.</p>	15
Unit -III	<p>Publication Misconduct: Group Discussion: a) Subject specific ethical issues, FFP, authorship b) Conflicts of interest c) Complaints and appeals: examples and fraud from India and abroad Software tools : Use of plagiarism software like Turnitin, Urkund and other open source software tools Databases And Research Metrics: Databases : Indexing databases, Citation databases: Web of Science, Scopus, etc. Research Metrics Impact Factor of journal as per Journal Citations Report, SNIP, SJR, IPP, Cite Score - Metrics: h-index, g index, i10 Index, altmetrics</p>	15

Recommended Books:

1. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity 2007.
2. The Student's Guide to Research Ethics By Paul Oliver Open University Press, 2003
3. Responsible Conduct of Research By Adil E. Shamoo; David B. Resnik Oxford University Press, 2003

4. 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.