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Directorate of Academic Planning JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA KAKINADA-533003, Andhra Pradesh, INDIA (Established by AP Government Act No. 30 of 2008)

Lr. No. DAP/02/M. Tech/RM &IPR/Clarification/2019

Date: 30-12-2019

Dr. R. Srinivasa Rao, M.E. Ph.D., Professor of EEE & **Director**, Academic Planning

CIRCULAR

Sub: JNTUK - M. Tech (R19 Regulation) - Syllabus of Research Methodology & IPR subject - Conduct of Internal & External Examination - Reg. Ref: This office Circular No. DAP/M. Tech/Clarification/Dec 2019, dated 31.12.2019

Continuation of this office Circular under reference cited. The Principals of the constituent Colleges and affiliated Colleges of JNTUK are informed that the syllabus for "Research Methodology & IPR" subject is enclosed herewith for Highway Engineering, Transportation Engineering and Petroleum Engineering specializations and the Syllabus is common for remaining all specialization for M.Tech (R19 Regulation) course with 2 credits. The evaluation should be done for 100 marks with internal 25 marks and external 75 marks.

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Common Syllabus for RESEARCH METHODOLOGY and IPR

UNIT I- RESEARCH PROBLEM AND SCOPE FOR SOLUTION

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT II- FORMAT

Effective literature studies approaches, analysis, Plagiarism, Research ethics. Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

UNIT III- PROCESS AND DEVELOPMENT

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, patenting under PCT.

UNIT IV- PATENT RIGHTS

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT V- NEW DEVELOPMENTS IN IPR

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

TEXT BOOKS

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"

- 2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- 3. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"

REFERENCES

- 1. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
- 2. Mayall, "Industrial Design", McGraw Hill, 1992.
- 3. Niebel, "Product Design", McGraw Hill, 1974.
- 4. Asimov, "Introduction to Design", Prentice Hall, 1962.
- 5. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
- 6. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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RESEARCH METHODOLOGY And IPR for Highway Engineering, Transportation Engineering & Petroleum Engineering.

UNIT - I

Research methodology: Objectives and motivation of research - Types of research - Research approaches - Significance of research - Research methods verses methodology - Research and scientific method - Importance of research methodology - Research process - Criteria of good research - Problems encountered by researchers in India - Benefits to the society in general. Defining the research problem: Definition of research problem - Problem formulation - Necessity of defining the problem - Technique involved in defining a problem.

$\mathbf{UNIT}-\mathbf{II}$

Literature survey: Importance of literature survey - Sources of information - Assessment of quality of journals and articles - Information through internet.

Literature review: Need of review - Guidelines for review - Record of research review.

UNIT – III

Research design: Meaning of research design - Need of research design - Feature of a good design - Important concepts related to research design - Different research designs - Basic principles of experimental design - Developing a research plan - Design of experimental set-up - Use of standards and codes.

$\mathbf{UNIT} - \mathbf{IV}$

Data collection: Collection of primary data - Secondary data - Data organization - Methods of data grouping - Diagrammatic representation of data - Graphic representation of data - Sample design - Need for sampling - Some important sampling definitions - Estimation of population - Role of statistics for data analysis - Parametric vs. non parametric methods - Descriptive statistics - Measures of central tendency and dispersion - Hypothesis testing - Use of statistical softwares.

Data Analysis: Deterministic and random data - Uncertainty analysis - Tests for significance - Chisquare - Student's t-test - Regression modeling - Direct and interaction effects - ANOVA - F-test -Time series analysis - Autocorrelation and autoregressive modeling.

UNIT - V

Research report writing: Format of the research report – Synopsis – Dissertation - Thesis - Its differentiation – References – Bibliography – Webliography - Technical paper writing - Journal report writing - Making presentation - Use of visual aids.

Research proposal preparation: Writing a research proposal and research report - Writing research grant proposal.

References:

1.C.R Kothari, "Research Methodology, Methods & Technique", New Age International Publishers, New Delhi, 2004.

2.R. Ganesan, "Research Methodology for Engineers", MJP Publishers, Chennai, 2011.

- 3. RatanKhananabis and SuvasisSaha, "Research Methodology", Universities Press, Hyderabad, 2015.
- 4.Y.P. Agarwal, "Statistical Methods: Concepts, Application and Computation", Sterling Publishing Pvt. Ltd., New Delhi, 2004.
- 5.Vijay Upagade and AravindShende, "Research Methodology", S. Chand & Company Ltd., New Delhi, 2009.

6.G. Nageswara Rao, "Research Methodology and Quantitative methods", BS Publications, Hyderabad, 2012.