



Syllabus and Scheme of assessment

for

Ph.D. Course work

Subject: Electronics

Faculty: Science

(Effective from Year-2018)

Department of Electronics

Saurashtra University

Rajkot

Paper 1: Steps towards the research and research methodology

Credit: 04

Unit 1: Introduction to research

Research aptitude

Concept and definition of research, Research objectives, motivation in conducting research, research characteristics, types of research, research process (all steps from step1 to step8), Dissertation and thesis, Basic bibliographic information, research ethics, stake holders in research, papers – articles – workshop – seminar – conference and symposium, impact factor

Information and Communication Technology useful in research

Meaning of Information and communication technology, ICT and education, major ICT learning categories, recent ICT initiatives in higher education, major initiatives in India for providing E – content courses, Key challenges in IT/ICT adoption in Indian universities, PAL-NTSC-SECAM, Frequency modulation, Prasar Bharati, all India radio(AIR), Doordarshan, community radio stations, Press and Print media, Public Information Campaigns(PICs), Main News Agencies in India, Basic computer terms, types of computers, computer hardware, programming language, language processor, How does a computer processes information?, computer network, The internet basics, hardware requirement for internet, software requirement for internet, main internet connection options, other important internet related terms, electronic mail, Glossary of ICT and internet terms,

Hypotheses

Types of hypotheses, source of hypotheses, characteristics of hypotheses, contents of good hypotheses, hypothesis testing, advantages of hypotheses, process of hypotheses testing, procedure for testing of hypotheses, steps in hypotheses testing, hypothesis testing for the two variances

Unit 2: Methods of data collection, data processing and analysis and Chi-square test

Sources of data, methods of data collection, primary data, observation method, limitation of observation method, classification of observation method, interview method, definition of interviews, objectives of interview, types of interviews, interviewer qualifications, survey through questionnaires and schedules, data collection through questionnaires, definition of questionnaires, computer direct interviews

Presenting of data, editing, coding, classification, tabulation, components of table, analysis of data, statistical analysis of data, measure of central tendency, mean, median, mode, geometric mean, harmonic mean, index number, analysis of time series, measure of dispersion

Uses of test, non-parametric test, chi-square formula, expected frequency, degree of freedom, level of significance, inference

Unit 3: Research report and presentation, preparing for research proposal and starting to write

Report drafting, types of reports, methods of research report writing, reference to footnotes, table and charts, bibliography and index, diagrammatic presentation, types of diagrams, one- dimension diagrams, two-dimensional diagram, three – dimensional diagrams, pictograms, cartograms

Types of research proposals, the main ingredients and sequence, finalizing your proposal, proposals for funded research, the writing process, forming the structure and preparing and outline, retrieving and organizing notes, drafting and redrafting, presentation, bibliographies-references-footnotes, check list of activities that will progress your research, consolidation and assessment

Unit 4: Honesty and research ethics

Honesty in your work: intellectual ownership and plagiarism, citation and acknowledgement, responsibility and accountability of the researcher, data and interpretations, where do you stand? epistemology

Situations that raise ethical issues: research aims, means and ends, ethics in relation to other people, participants, carrying out the research, dissemination

Ethics, policies, permissions and committees: organizations, ethics committees, plan your code of ethics

Recommended Books:

1. CBSE UGC NET/SET/JRF paper 1: Teaching and research aptitude
K V S Madaan
Pearson
2. Research methodology
Dr. Vijay Upagade and Dr. Arvind Shende
S. Chand & Co.
3. Your research project
Nicholas Walliman
Vistaar Publication
New Delhi

Reference Books:

1. Conducting research literature reviews: from internet to paper
Arlene Fink
Sage publications
2. The essential guide to Doing your research project
Zina O'Leary
Sage publication
3. Research methodology: A process of inquiry
Anthony M. Graziano and Michael L. Raulin
Longman
4. Research for development: A practical guide
Sophie Laws, Caroline Harper and Rachel Marcus
Vistaar Publication, New Delhi
5. Essentials of research methodology: Methods, tools and techniques
Manisha S. Sutar
Vital Publication, Jaipur, India
6. Research methodology
Dr. Bindrawan Lal
ABD publishers, Jaipur, India

Paper 2: Interdisciplinary studies useful in electronics

Credit: 04

Unit 1: Object designing

Starting NX, User Interface, Quick Access Toolbar, File Menu, Ribbon, Ribbon Groups and More, Galleries, Top Border Bar, Menu, Status bar, Resource Bar, Part Navigator, Roles Navigator, Touch Panel, Touch Tablet, Dialogs, Mouse Functions, Left Mouse button (MB1), Middle Mouse button, (MB2), Right Mouse button (MB3), Color Settings, Shortcut Keys, TUTORIAL 1, Starting a New Part File, Starting a Sketch, Adding Dimensions, Constructing the Base Feature, Adding an Extruded Feature, Adding Constraints and Dimensions to the Sketch, Adding Dimensions, Trimming Sketch Entities, Extruding the Sketch, Adding another Extruded Feature, Saving the Part, TUTORIAL 2, Open a New Part File, Sketching a Revolve Profile, Constructing the Revolved Feature, Constructing the Cut feature, Adding another Cutout, Adding Edge blend, Saving the Part, TUTORIAL 3, Opening a New Part File, Constructing the Revolved Feature, Creating Cut feature, Saving the Part, TUTORIAL 4, Constructing Extruded feature, Applying Draft, Saving the Part, TUTORIAL 5, Copying the Part files into a new folder, Opening a New Assembly File, Inserting the Base Component, Adding the second component, Checking the Degrees of the Freedom, Fixing the Flange, Hiding the Flange, Adding the Third Component, Showing the Hidden Flange, Hiding the Reference Planes, sketches, and onstraint symbols, Saving the Assembly, Starting the Main assembly, Adding Disc to the Assembly, Fixing the Disc to the Origin, Placing the Sub-assembly, Placing second instance, of the Sub-assembly, Saving the Assembly, TUTORIAL 6, Producing the Exploded view, Creating Tracelines, TUTORIAL 7, Opening a New Drawing File, Editing the Drawing Sheet, Generating the Base View, Generating the Section View, Generating the Detailed View, Setting the Annotation Preferences, Dimensioning the Drawing Views, TUTORIAL 8, Creating a custom template, Adding Borders and Title Block, Opening a newdrawing file using the custom template, Generating Drawing Views, Adding Dimensions, TUTORIAL 9, Creating the assembly drawing, Generating the Exploded View, Generating the Part list, Generating Balloons, TUTORIAL 10 (Creating Rectangles), Multi-Selection Gesture Drop-down, TUTORIAL 11 (Creating Polygons), TUTORIAL 12 (Studio Splines), TUTORIAL 13 (Geometric Constraints), Adding Constraints, Adding Dimensions, TUTORIAL 14 (Resolving Over-Constrained Sketch), TUTORIAL 15 (Ellipses), TUTORIAL 16 (Conics), TUTORIAL 17 (Quick Extend, Quick Trim, Make Corner, and Offset Curve), Make Corner, Quick Trim, Offset Curve, TUTORIAL 18, Fillet, Chamfer, Mirror Curve, Adding Dimensions, TUTORIAL 18, Constructing the Helix, Adding the Datum Plane, Constructing the Sweep feature, TUTORIAL 19, Constructing the Groove feature, TUTORIAL 20, Creating Sections and Guide curves, Creating another section, Constructing the swept feature, Constructing the Extruded feature, Adding the Emboss feature, Adding Edge Blend, Shelling the Model, Adding Threads, TUTORIAL 21, Constructing a cylindrical shell, Adding slots, Constructing the Linear pattern, Constructing the Circular pattern, TUTORIAL 22, Constructing the Tube feature, Patterning the Tube geometry, Boolean Operations, TUTORIAL 23, Constructing the first feature, Constructing the Second Feature, Constructing the third feature, Drilling Holes, Adding Chamfers, Edit Parameters, Show Dimensions, Editing Features by Double-clicking, Supress Features, TUTORIAL 24, Constructing the first feature, Constructing the Extruded cut, Constructing the Extruded cut, Making the Along Pattern, Measuring the Mass Properties, TUTORIAL 25, Creating the First Feature, Creating the Extruded surface, Trim Body, Variable Radius Blend, Corner Setbacks, Creating a Boss, Split Body, Shell with an Alternate, Thickness, Offset Face, Delete Body, Scale Body, Extract Geometry, TUTORIAL 26, Replace Features, TUTORIAL 27, Applying Draft using the To Parting Edges option, TUTORIAL 28, TUTORIAL 29, TUTORIAL 30,

Unit 2: Bench work and fitting

Vices, V – block, surface plate, try square, bevel square or bevel gauge, combination set, files, scrapers, chisels, Hack saws, simple scribing block or surface gauge, universal surface gauge, punches, hammers, calipers – outside & inside, spring calipers, Hermaphrodite caliper, dividers, pliers, spanners, screw drivers, drills, taps, dies and die sticks, screw pitch gauge, fillet and radius gauge, Micrometers: Outside and inside, metric micrometer (O.S.), the inches micrometer (O.S.), inside micrometer, Vernier calipers, principle of Vernier calipers, reading the Vernier, Vernier depth gauge, Vernier Height gauge, micrometer depth gauge, telescopic gauge, straight gauge, universal Bevel protractor, wire gauge, dial gauge or dial indicators, processes – Marking, chipping, sawing, filing, draw filing, do and don'ts in filing, scraping, drilling, internal threading or tapping, external threading or Dieing,

Unit 3: Fasteners and fastening

Threaded fasteners, terminology of screw threads, right and left hand threads, start of threads, forms of screw threads – B.S.W. threads, B.A. threads, Buttress threads, Seller's or A.N. threads, square threads, Acme threads, Knuckle threads, Unified threads, I.S.O. or International threads, standard screwed fasteners, bolts, studs, screws – cap screws, machine screws, set screws, nuts, locking of threaded fasteners, foundation bolts, washers, riveting, riveted joints – lap and Butt joints, joint failures and relevant proportions, preparation and procedure, portable drills – Breast drill, Ratchet drill, portable electric drill, Caulking and Fullering.

Unit 4: Sheet metal work

Metals used in sheet metal work –Black iron, galvanised iron, copper sheets, aluminium sheets, tin plates, stainless steel, brass, lead, zinc,, Hand tools, other commonly required tools, sheet metal operations, measuring and marking, cleaning, laying out, cutting and machine shearing, nibbling, circle cutting, piercing and blanking, edge forming and wiring, joint marking, bending, drawing, soldering, sheet metal working machines, grooving machine, Peining machine, swaging machine, beading machine, folded sheet metal joints, preparing the pattern lay out, common methods of pattern lay out – parallel line method, radial line method, triangulation method, basic concept of development of a surface.

Recommended books:

1. NX 10.0 for engineers and designers
Prof. Sham Tickoo
Dreamtech press
2. A course in workshop technology, Vol 1 Manufacturing processes
B.S. Raghuwanshi
Dhanpat Rai & Co.

SCHEME OF ASSESSMENT FOR Ph.D. COURSEWORK

The assessment scheme for Ph.D. coursework consists of two parts:

1. Credit earned
2. Passing marks in written examination

1. Credit earned:

The whole course has total 8 credits divided into two papers having 4 credits for each paper. One credit consists of 15 hours of actual classroom teaching. Hence, each paper has total 60 Hours of actual teaching. If a student attends 60 Hours of class room teaching in each paper, he/she will earn total of 4 credits in that paper. A student will be eligible to take the written examination of Ph.D. coursework if he/she obtains minimum of 3 credits in each paper. In other words, he/she has to acquire the minimum attendance of 45 Hours out of 60 Hours of actual teaching in **each paper**.

1(A):

If a candidate fails to obtain minimum 3 credits or 45 Hours of attendance in current academic term, he/she will not be eligible to register for Ph.D. in that terms. However, he/she will be eligible to carry forward whatever credit he/she has obtained in the concerned terms. The candidate will be eligible to take written Ph.D. examination after earning total of 3 credits or 45 hours of attendance in case he/she accumulates the credits or attendance in piecemeal in each academic terms.

1(B):

The candidates who fail to earn minimum credit or the attendance, can resume his/her coursework as and when the coursework is offered by the Electronics Department. No special course hours or classroom teaching will be offered to such candidates.

2. Passing standard in the written examination:

There will a written examination for each paper consisting of 100 marks. To pass the written examination, the candidate will have to obtain minimum 50 marks in **each paper, separately**.

2(A):

If the candidate fails to obtain the required minimum marks in the written examination, he/she can appear in the next examination as and when offered by the Department of Electronics.

2(B):

There is no limit to the number of attempts to pass the written examination. This clause will be in effect till different rules are made in due course of time.