Where talent meets opportunity

SRI SATYA SAI UNIVERSITY
OF TECHNOLOGY AND MEDICAL SCIENCES

BOARD OF STUDIES MEETING(BOS) & SYLLABUS

Department/Program-All Engineering Dept./PhD

2017-18 TO 2021-22

www.sssutms.co.in

Opp.Oilfed Plant, Bhopal-Indore Road,Sehore (M.P), Pin - 466001

(+91) 07562-292740 | 7562292720

Sri Satya Sai
University of Technology and Medical Sciences

(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

Name of Faculty: **School of Engineering**

Name of Department: **Mechanical Engineering**

Minutes of Board of Studies Committee Meeting Dated on 05.04.21

The Board of Studies Committee of Department of Mechanical Engineering was conducted a meeting in online mode through google meet at 1:00 PM. on 05.04.21. Following members were present.

1. Dr. G.R.Selokar,	SSSUTMS, Sehore	Chairman
2. Dr. Nilesh Diwakar	SSSUTMS, Sehore	Internal member
3. Dr. Dhananjay Yadav	SSSUTMS, Sehore	Internal member
4. Dr.Vilas Warudkar	MANIT, Bhopal	External Member
5. Dr. A.C.Tiwari	UIT RGPV Bhopal	External Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda were discussed and resolved.

Agenda:

Modification in syllabus of Ph.D (**Mechanical Engineering**) course work I & II.

Discussion on Syllabus

Syllabus was put before the members as per AICTE guidelines met the current demand in research areas, it was discussed in details by the members and some modifications were suggested.

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Fax : 07562-223644, Web: www.sssutms.co.in, info@sssutms.co.in

Registrar
Sri Satya Sai University of Technology & Medical Sciences Sehore (M.P.)

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Resolution of the Discussion:

It was resolved that Syllabus for course work follow AICTE guidelines and which also met the current demand in research areas, should be modified and may be accepted.

In course work-II, firstly Student will select their area of research. Based on this area, student will follow particular subjects and their syllabus.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. G.R.Selokar,	SSSUTMS, Sehore	Chairman
2. Dr. Nilesh Diwakar	SSSUTMS, Sehore	Internal member
3. Dr. Dhananjay Yadav	SSSUTMS, Sehore	Internal member
4. Dr.Vilas Warudkar	MANIT, Bhopal	External Member
5. Dr. A.C.Tiwari	UIT RGPV Bhopal	External Member

Chairman

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SRI SATYA SAI

UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES
SEHORE (MP)

Research Methodology

Ph.D. Course Work (I) Syllabus

Registrar
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& Medical Sciences Sehore (M.P.)

Research Methodology

Unit I:- Research Foundation:

Evolution of scientific inquiry and Research, definition, characteristics , types and objectives of Research, importance of Research methodology in scientific Research. Selection and formulation of Research problem. Research design: meaning of Research design, features of good research design , inductive, deductive, and development of models.

Hypothesis: Different types and significance, development of working Hypothesis, Null Hypothesis.

Unit II: - Review of Literature:

Meaning and Significance of review of literature, literature search procedure , sources of literature: primary and secondary sources, web source, critical literature review , Review Quality Instrument(RQI) .

Unit-III:- Data Collection And Analysis:

Data Collection Sources of data – primary, secondary and tertiary Types of data- categorical, nominal and ordinal methods of data collection: observations, field investigations, Direct studies: reports, record, or experimental observations.

Data analysis: graphical representation, descriptive analysis, inferential analysis, correction analysis and regression analysis. Measure of central tendency, measure of dispersion, measure of variation, Measure of central tendency vs measure of dispersion, normal distribution, measure of skewness and interpretation, purpose and use of chi-square test. Data analysis by using statistical software's: MATLAB, MINITAB and SPSS. Hypothesis Testing, generalization, interpretation and modeling.

Unit IV :- Scientific Writing And Ethics:

Scientific Writing: Structure and components of research paper and thesis writing. Different steps in the preparation: Layout, structure, language, illustrations, tables, citation styles and Bibliography.

Ethics: Ethical issue, Ethical committees, commercialization, copy right , royalty, intellectual property, rights and patent laws, plagiarism, citation, acknowledgement, Reproducibility and accountability

Registrar
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Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

Statistics Introduction to Statistics - Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Mean, mode, median and Proportions.

References:

1. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition New Age International Publishers, New Delhi.
2. Sinha, S.C. and Dhiman, A..2002. Research Methodology, Ess Ess Publications.2 volumes.
3. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons.New Delhi. 1470 p.
4. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
5. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
6. Research Methodology Dr PM Bulakh,Dr P. S. Patki and DrAS Chodhary 2010OPublished by Expert Trading Corporation Dahisar West, Mumbai 400068
7. Statistical method for Research works by fisher R.A. Cosmo publication, New Delhi ISBN : 81-307-0128-6
8. Design and analysis of experiments by montogomery D.C., john wiley ,ISBN: 0471260088
9. MINITAB online manual
10. Methodology of Research in Social Science by O.R. Krishnaswamy and Rangnatham, Himalaya Publication Hore, ISBN: 8184880936
11. SPSS online manual.

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SUBJECT SPECIALIZATION-I
SUBJECT: MECHANICAL ENGINEERING

UNIT- I

Basics of Mechanical Engineering :

Engineering Thermodynamics: First Law of Thermodynamics, Second Law of Thermodynamics, Availability & Irreversibility, Pure Substances, Air Standard Cycles, Computational Fluid Dynamics Internal Combustion Engines: Combustion in S.I. & C.I. Engines, Lubrication & Cooling Systems, Engine Testing and Performance, Supercharging, Gas Turbines and Jet Propulsion, Power Plant Engineering, Automobile Engineering Heat and Mass Transfer: Basic Laws, Conduction, Extended Surface Conduction, Convection, Thermal Radiation, Heat Exchangers, Mass Transfer Refrigeration and Air-Conditioning: Air Refrigeration System, Vapour Compression Refrigeration System, Vapour Absorption Systems and Refrigerants, Psychrometry, Air Conditioning. Fluid mechanics: Governing equations, Navier-Stokes equations, Boundary Layers, Turbulent flow, Turbulent Shear flows, Compressible flow.

UNIT-II

Machine Design:

Strength of Material: Mechanical Properties and Testing, Deflection of Beams, Torsion of Shafts, Columns & Struts, Strain Energy, Pressure Vessels, Composite Materials Its Classification and Processing Methods, Advanced Mechanics of Solids Theory of Machines: Mechanisms and Machine, Gear and Gear Trains, Cams, Engine Dynamics, Governors, Balancing, Gyroscope Design of Machine Elements: Engineering materials and properties, Design for Production, Belt, Rope, Chain Drives, Design of Shaft, Bearings, Springs, Tribology. Mechanical Vibrations: Fundamentals of Vibration, Vibration of Single Degree of Freedom System, Vibration of Multi Degree of Freedom, Vibration of Continuous Systems, Static and Dynamics Testing of Machine Tools. Manufacturing Technology: Fundamental Machine Tool Operations, Casting, Welding, Bulk Metal Forming Processes, Forging, Extrusion, Rolling, Non-Conventional Manufacturing Processes Machine Tool Engineering: Fundamental of Metal Cutting, Machine Tool Design, Vibration in Machine Tools, NC, CNC, DNC Machine Tools, Automation in Manufacturing, FMS, CIMS

UNIT-III

CAD/CAM/CNC:

Computer aided design & manufacturing: CAD/CAM: Fundamentals of Computer Aided Design, Geometrical Transformation, Plane Curves, Geometrical Modelling, Application of CAD Techniques to Finite Element Mesh Generation, Computer Aided Manufacturing, Rapid Prototyping, Robotics & AGVs CAD/CAM Hardware & Software, Numerical Control: Numerical Control & its components, NC procedure and motion control systems, applications and economics of NC/CNC programmingmanual, computer-assisted and voice programming. Computer Control in N.C. CNC, DNC and combined DNC/CNC Systems, Adaptive control

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w.e.f. 2021-22

machining systems, latest developments. Group Technology And Process Planning: Concepts of Group Technology. Traditional & Computer Aided Process Planning, Retrieval & Generative Process Planning, Machinability data systems, computer-generated time standards. Computer-Integrated Production Management System: Introduction to computer aided Production Planning and Control, Cost planning and control, Introduction to computer aided inventory management & material requirement planning. Shop Floor Control & Computer Process Monitoring: Shop Floor Control System, Operation Scheduling, Factory data collection system, Computer Process monitoring. Computer Process Interfacing & Control: Manufacturing Process data & System interpretation, Interface hardware devices, Digital input/output processing, Process control strategies, Distributed control vs. Central control, direct digital control and Supervisory Computer control.

UNIT -IV

Finite Element Method:

One dimensional problems – Finite element modeling, Co-Ordinate and shape functions, Potential energy approach, Garlekin's method, Global stiffness matrix. Finite Element Analysis of 2-D problems Basic boundary value problems in 2-D, Triangular, Quadrilateral, Higher order elements, Poisson's and Laplace equations, Isoparametric formulation – Natural Co-ordinate system, Lagrangian interpolation polynomials. Solution to plane elasticity problems – Introduction to theory of elasticity. Special Topics: - Dynamic Analysis, Equation of motion, mass matrices, Free vibration analysis, Natural frequencies of longitudinal, Transverse, Torsional vibration. Computer Integrated Manufacturing: Development of CIM, fundamentals of CAD/CAM, computerized networks for manufacturing, Production operations and automation strategies, production economics. Automated inspection and testing, QC and CIM, computer aided inspection using robots, integrated computer aided inspection system, flexible inspection system. Introduction to control systems, linear control systems, linear feedback control systems, optimal control, sequence control and programmable controllers, process control

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UNIT-V

Reliability, Maintenance and Advanced Mechatronics:

Reliability engineering and maintenance management: concepts of reliability, failure rate and hazard rate, common distribution in failure mechanism, system reliability analysis- parallel, series, standby, shared load and complex system; determination of system reliability- set theory, star-delta method, matrix method, and event tree method. Monte Carlo simulation and Techno economic life. Fault Tree Analysis (FTA), Failure Mode and Effect Analysis (FMEA), Failure Modes, Effects and Criticality Analysis (FMECA). Replacement theories based on reliability effort function, in- built reliability in design and life castings. Mechatronics: Sensors, transducers and Encoders, resolvers for position and motion control, solenoide valves, ball screws. Drives and Actuators, Digital and servomotors, hydraulic and Pneumatic motors, motor speed control, Electronic Hardware. Electronic system communication – Interfacing and Buses, A/D and D/A Convertors, Integration of hard ware components, system response of Electronic and Mechanical systems. Software Control.

References:

1. Yuman S.W – Foundations of Fluid Mechanics.
2. An Introduction to Compressible Flow – Pai.
3. Dynamics & Theory and Dynamics of Compressible Fluid Flow – Shapiro.
4. Fluid Mechanics and Machinery – D. Rama Durgaiah.(New Age Pub.)
5. Fluid Dynamics – William F. Hughes & John A. Brighton (Tata McGraw-Hill Pub.)
6. Fundamentals of Heat & Mass Transfer – Incroera Dewitt (Jhon Wiley)
7. Heat Transfer : A basic approach – Yunus Cangel (MH)
8. Heat & Mass Transfer – D.S. Kumar
9. Heat Transfer – P.K. Nag(TMH)
10. Principle of Heat Transfer – Frank Kreith & Mark.Bohn.
11. Convective Heat and Mass Transfer / W.M.Kays & M.E.Crawford(TMH)
12. Grover GK; Mechanical Vibration;
13. Thomson WT; Theory of Vibration with applications; PHI
14. Ambekar; Mechanical vibrations and noise engineering; PHI
15. CAD/CAM Theory and Practice - Zeid, Mc Graw Hill.- 1991.
16. Computer Integrated Design and Manufacturing, - Mark Henderson & Philip Wolfe,

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Ref. No. : _____ Date :

Name of Faculty: **School of Engineering**

Name of Department: **Electrical Engineering**

Minutes of Board of Studies Committee Meeting Dated on 05.04.21

The Board of Studies Committee of Department of Electrical Engineering was conducted a meeting in online mode through google meet at 1:30 PM. on 05.04.21. Following members were present.

1. Dr. Dr. A.A Ansari,	SSSUTMS, Sehore	Chairman
2.Dr. Prabodh Kumar Khampariya	SSSUTMS, Sehore	Internal member
3. Dr. A. S Rathore	SSSUTMS, Sehore	Internal member
4. Dr.Vijay Prakash Singh	SSSUTMS, Sehore	Internal member
5. Prof. N.P.Patidar	MANIT Bhopal	External Member
6. Dr.Sidhharth Panda	SVUIT, Burla -	External Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda were discussed and resolved.

Agenda:

Modification in syllabus of Ph.D (**Electrical Engineering**) course work I & II.

Discussion on Syllabus

Syllabus was put before the members as per AICTE guidelines met the current demand in research areas, it was discussed in details by the members and some modifications were suggested.

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Ref. No. : _____ Date : 11/04/2021

Resolution of the Discussion:

It was resolved that Syllabus for course work follow AICTE guidelines and which also met the current demand in research areas, should be modified and may be accepted.

In course work-II, firstly Student will select their area of research. Based on this area, student will follow particular subjects and their syllabus.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Dr. A.A Ansari SSSUTMS,	SSSUTMS, Sehore	Chairman
2. Dr. Prabodh Kumar Khampariya	SSSUTMS, Sehore	Internal member
3. Dr. A. S Rathore	SSSUTMS, Sehore	Internal member
4. Dr.Vijay Prakash Singh	SSSUTMS, Sehore	Internal member
5. Prof. N.P.PATIDAR	MANIT NHOPAL	External Member
6. Dr.SIDHHARTH Panda	SVUIT, Burla -	External Member

Chairman

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SRI SATYA SAI

UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES
SEHORE (MP)

Research Methodology

Ph.D. Course Work (I) Syllabus

Research Methodology

Unit I:- Research Foundation:

Evolution of scientific inquiry and Research, definition, characteristics , types and objectives of Research, importance of Research methodology in scientific Research. Selection and formulation of Research problem. Research design: meaning of Research design, features of good research design , inductive, deductive, and development of models.

Hypothesis: Different types and significance, development of working Hypothesis, Null Hypothesis.

Unit II: - Review of Literature:

Meaning and Significance of review of literature, literature search procedure , sources of literature: primary and secondary sources, web source, critical literature review , Review Quality Instrument(RQI) .

Unit-III:- Data Collection And Analysis:

Data Collection Sources of data – primary, secondary and tertiary Types of data- categorical, nominal and ordinal methods of data collection: observations, field investigations, Direct studies: reports, record, or experimental observations.

Data analysis: graphical representation, descriptive analysis, inferential analysis, correction analysis and regression analysis. Measure of central tendency, measure of dispersion, measure of variation, Measure of central tendency vs measure of dispersion, normal distribution, measure of skewness and interpretation, purpose and use of chi-square test. Data analysis by using statistical software's: MATLAB, MINITAB and SPSS. Hypothesis Testing, generalization, interpretation and modeling.

Unit IV :- Scientific Writing And Ethics:

Scientific Writing: Structure and components of research paper and thesis writing. Different steps in the preparation: Layout, structure, language, illustrations, tables, citation styles and Bibliography.

Ethics: Ethical issue, Ethical committees, commercialization, copy right , royalty, intellectual property, rights and patent laws, plagiarism, citation, acknowledgement, Reproducibility and accountability

Registrar
Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

Statistics Introduction to Statistics - Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Mean, mode, median and Proportions.

References:

1. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition New Age International Publishers, New Delhi.
2. Sinha, S.C. and Dhiman, A.,2002. Research Methodology, Ess Ess Publications.2 volumes.
3. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons.New Delhi. 1470 p.
4. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
5. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
6. Research Methodology Dr PM Bulakh,Dr P. S. Patki and DrAS Chodhary 2010OPublished by Expert Trading Corporation Dahisar West, Mumbai 400068
7. Statistical method for Research works by fisher R.A. Cosmo publication, New Delhi ISBN : 81-307-0128-6
8. Design and analysis of experimsents by montogomery D.C., john wiley ,ISBN: 0471260088
9. MINITAB online manual
10. Methodology of Research in Social Science by O.R. Krishnaswamy and Rangnatham, Himalaya Publication Hore, ISBN: 81848880936
11. SPSS online manual.

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SUBJECT SPECIALIZATION-I
SUBJECT: Electrical Engineering

UNIT- I

Electric Circuits and Fields:

Network graph, KCL, KVL, node and mesh analysis, transient response of dc and ac networks; sinusoidal steady-state analysis, resonance, basic filter concepts; ideal current and voltage sources, The venin's, Norton's and Superposition and Maximum Power Transfer theorems

UNIT-II

Signals and Systems:

Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

UNIT-III

Electrical Machines:

Single phase transformer - equivalent circuit, pharos diagram, tests, regulation and efficiency; three phase transformers - connections, parallel operation; auto-transformer; energy conversion principles

UNIT –IV

Power Systems:

Basic power generation concepts; transmission line models and performance; cable performance, insulation; corona and radio interference; distribution systems; per-unit quantities; bus impedance and admittance matrices; load flow; voltage control; power factor correction; economic operation; symmetrical components; fault analysis

UNIT-V

Power Electronics and Drives:

Semiconductor power diodes, transistors, thrusters, traces, GTOs, MOSFETs and IGBTs - static characteristics and principles of operation; triggering circuits; phase control rectifiers;

References:

1. M E Van Valkenburg , Network Analysis and Synthesis , Phi Learning
2. Oppenheim, Signals & Systems, Prentice Hall Signal
3. P S Bimbhra ,Electrical Machinery , Khanna Publishers
4. C. L. Wadhwa , Electrical Power Systems , New Age International
5. Rashid Muhammad H, Power Electronics, Pearson Education India

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

[Established Under Act. 06 of 2014 by Govt. of Madhya Pradesh]
Approved by Madhya Pradesh Private University Regulatory Commission
Bhopal Indore Road, Opposite Pachama Oilfed Plant, Pachama, Sehore. Phone: (07562) - 222482
Corp. Office: 202, Zone-I, Ganga Jamuna Complex (Basement), M.P. Nagar, Bhopal (M.P.) Ph: (0755) 5270996, Fax (0755) 5270918

Sri Satya Sai University of Technology and Medical Sciences, Sehore

Minutes of meeting Board of studies meeting

Name of Department: Electronics and Communication Engineering

Minutes of Board of Studies Committee Meeting Held on Dates **04/04 /2021**

The Board of Studies Committee Meeting was held in the room of Department of Electronics and Communication Engineering at 11:00 AM. On **04/04/2021**, Following members were present.

1. Dr. R.P Singh	SSSUTMS, Sehore	Chairman
2. Dr. A. S Rathore	SSSUTMS, Sehore	Internal member
3. Dr.Subhasis Bose	SSSUTMS, Sehore	Internal member
4. Dr. Dheeraj K. Agarwal	MANIT Bhopal	Extenal member
5. Dr. Ram Bilas Pachori	IIT Indore	External Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up the faculty for Progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda 1. The revision of the syllabus of PhD course work I & II Electronics and Communication Engineering .

Discussion:-- Discussed by the members of the Board of Studies. In which it is discussed that in programs phd Electronics and Communication Engineering changes are incorporated with the syllabus of first semester will changed subject portion would be replaced on the place of " research methodology and First semester will included the topic

UNIT-IV Digital PAM, binary PAM formats, line coding, band limited digital PAM systems, Nyquist pulse shaping, equalization, synchronization techniques.

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UNIT-.V Adhoc Wireless Networks- Cellular and Adhoc Wireless Networks, Applications, MAC protocols, Routing, Multicasting, Transport layer protocols, Quality of service browsing, Adhoc Wireless Internet.

The maximum contents of the revised syllabus have been taken from the syllabus published by Madhya Pradesh Higher Education from time to time.

Resolution:-

It is resolved that The revised syllabus were discussed and recommended for implementation from academic session 2021-22 for the PhD Electronics and Communication Engineering students. admitted in session 2021-22 Minutes of the meeting may be placed before the academic council for approval. Chairman thanks the members for peaceful conduction of meeting.

Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairperson)

1. Dr. R.P Singh
2. Dr. A. S Rathore
3. Dr.Subhasis Bose
4. Dr. Dheeraj K. Agarwal
5. Dr. Ram Bilas Pachori

Sri Satya Sai University of Technology & Medical Sciences Sehore (M.P.)

UTMS SEHORE (M.P.)

Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

Statistics Introduction to Statistics - Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Mean, mode, median and Proportions.

References:

1. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition New Age International Publishers, New Delhi.
2. Sinha, S.C. and Dhiman, A.,2002. Research Methodology, Ess Ess Publications.2 volumes.
3. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons.New Delhi. 1470 p.
4. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
5. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
6. Research Methodology Dr PM Bulakh,Dr P. S. Patki and DrAS Chodhary 2010OPublished by Expert Trading Corporation Dahisar West, Mumbai 400068
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8. Design and analysis of experiments by montogomery D.C., john wiley ,ISBN: 0471260088
9. MINITAB online manual
10. Methodology of Research in Social Science by O.R. Krishnaswamy and Rangnatham, Himalaya Publication Hore, ISBN: 8184880936
11. SPSS online manual.

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w.e.f 2021-22

S S U T M S * SEHORE (M.P.)

SUBJECT SPECIALIZATION-I
SUBJECT: ELECTRONICS AND COMMUNICATION ENGINEERING

UNIT- I

Analog Circuits:

Small Signal Equivalent circuits of diodes, BJTs, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single-and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators; criterion for oscillation; single transistor and op-amp configurations. Function generators and wave-shaping circuits, 555 Timers. Power supplies.

UNIT-II

Analog Communication:

Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions.

UNIT-III

Digital Circuits:

Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift-registers. Sample and hold circuits, ADCs, DACs.

UNIT-IV

Digital Communication:

Digital PAM, binary PAM formats, line coding, band limited digital PAM systems, Nyquist pulse shaping, equalization, synchronization techniques, bit and frame synchronization. Coded pulse modulation, voice digitization rate (VDR) of PCM, DPCM, DM, ADM, CVSD, log PCM, their performance comparison, VDR reduction by speech coding, VOCODERS, AT & T and CCITT hierarchies, quasi-synchronous multiplexes, Digital CW modulation, BPSK, DPSK, DEPSK, QPSK, QASK, BFSK, Doubinary encoding, QPR coherent and non-coherent systems, error probabilities in PSK, DPSK, FSK, QPSK, 16 QAM, MSK, QPR . ISDN & Value added communication system simulation & Analysis using MATLAB.

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S.S.U.T.M.S. Sehore (M.P.)

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Ref. No.: SSBaS/SoE/CSE/01 Date: 25/06/2021

Name of Faculty: **School of Engineering**

Name of Department: **Computer Science & Engineering**

Minutes of Board of Studies Committee Meeting Dated on 25-06-2021

The Board of Studies Committee of Department of Computer Science & Engineering was conducted a meeting in online mode through google meet at 3:30 PM. on 25-06-2021. Following members were present.

Following members were present.

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
3. Dr. Neeraj Sharma, Asst. Prof., Chairman
4. Dr. Harsh Pratap Singh, Asst. Prof., Member
5. Dr. Jitendra Sheetlani, Asst. Prof., Member
6. Dr Pankaj kawadkar, Asst. Prof., Member
7. Mr. Arif Hakeem, Asst. Prof., Member
8. Mr. Manoj Verma, Asst. Prof., Member
9. Mr. Harsh Lohiya, Asst. Prof. Member
10. Mr. Kailash Patidar, Asst. Prof., Member
11. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda points were discussed and resolved.

Agenda:

Modification in syllabus of Ph.D (Computer Science & Engineering) course work I & II.

Registrar
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University of Technology and Medical Sciences

(Established under Govt. of M.P. Registered under UGC 2(F) 1956)

Ref. No.: SSSBOS/SOE/CSE/01 Date: 25/06/2021

Discussion Scheme & Syllabus

Scheme and Syllabus was put before the members as per AICTE guidelines met the current demand in industry, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that Syllabus for course work follow AICTE guidelines and which also met the current demand in research areas, should be modified and may be accepted.

In course work-II, firstly Student will select their area of research. Based on this area, student will follow particular subjects and their syllabus.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
3. Dr. Neeraj Sharma, Asst. Prof., Chairman
4. Dr. Harsh Pratap Singh, Asst. Prof., Member
5. Dr. Jitendra Sheetlani, Asst. Prof., Member
6. Dr Pankaj kawadkar, Asst. Prof., Member
7. Mr. Arif Hakeem, Asst. Prof., Member
8. Mr. Manoj Verma, Asst. Prof., Member
9. Mr. Harsh Lohiya, Asst. Prof. Member
10. Mr. Kailash Patidar, Asst. Prof., Member
11. Mr. Narendra Sharma, Asst. Prof., Member

Registrar

Chairman

Bhopal-Indore Road, Opp. Pachama oilfed plant, Pachama, Dist.-Sehore M.P.PIN-466001 Ph. 07562-223647.
Fax: 07562-223644, Web: www.sssutms.co.in, info@sssutms.co.in

Research Methodology

Unit I:- Research Foundation:

Evolution of scientific inquiry and Research, definition, characteristics , types and objectives of Research, importance of Research methodology in scientific Research. Selection and formulation of Research problem. Research design: meaning of Research design, features of good research design , inductive, deductive, and development of models.

Hypothesis: Different types and significance, development of working Hypothesis, Null Hypothesis.

Unit II: - Review of Literature:

Meaning and Significance of review of literature, literature search procedure , sources of literature: primary and secondary sources, web source, critical literature review , Review Quality Instrument(RQI) .

Unit-III:- Data Collection And Analysis:

Data Collection Sources of data – primary, secondary and tertiary Types of data- categorical, nominal and ordinal methods of data collection: observations, field investigations, Direct studies: reports, record, or experimental observations.

Data analysis: graphical representation, descriptive analysis, inferential analysis, correction analysis and regression analysis. Measure of central tendency, measure of dispersion, measure of variation, Measure of central tendency vs measure of dispersion, normal distribution, measure of skewness and interpretation, purpose and use of chi-square test. Data analysis by using statistical software's: MATLAB, MINITAB and SPSS. Hypothesis Testing, generalization, interpretation and modeling.

Unit IV :- Scientific Writing And Ethics:

Scientific Writing: Structure and components of research paper and thesis writing. Different steps in the preparation: Layout, structure, language, illustrations, tables, citation styles and Bibliography.

Ethics: Ethical issue, Ethical committees, commercialization, copy right , royalty, intellectual property, rights and patent laws, plagiarism, citation, acknowledgement, Reproducibility and accountability

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Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

Statistics Introduction to Statistics - Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Mean, mode, median and Proportions.

References:

1. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition New Age International Publishers, New Delhi.
2. Sinha, S.C. and Dhiman, A.,2002. Research Methodology, Ess Ess Publications.2 volumes.
3. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons.New Delhi. 1470 p.
4. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
5. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
6. Research Methodology Dr PM Bulakh,Dr P. S. Patki and DrAS Chodhary 2010OPublished by Expert Trading Corporation Dahisar West, Mumbai 400068
7. Statistical method for Research works by fisher R.A. Cosmo publication, New Delhi ISBN : 81-307-0128-6
8. Design and analysis of experiments by montogomery D.C., john wiley ,ISBN: 0471260088
9. MINITAB online manual
10. Methodology of Research in Social Science by O.R. Krishnaswamy and Rangnatham, Himalaya Publication Hore, ISBN: 8184880936
11. SPSS online manual.

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SUBJECT SPECIALIZATION-I
SUBJECT: Computer Science and Engineering

UNIT- I

Graph Theory:

Basic terminology, multigraphs and weighted graph, paths and circuits, shortest path algorithm, Euler and Hamiltonian Paths and circuits, factors of a graph, Planer graph. Trees: Trees, rooted trees, path length in rooted trees, prefix code, binary search trees, spanning trees and cut set, minimum spanning trees. Set Theory: Set, Combinations of Sets, Mathematical Induction, and Principle of inclusion and Exclusion. Theory of Computation: Finite State Machines: Deterministic and Non-deterministic FSM"s, Moore and Mealy FSM"s. Regular Expressions: Converting DFA"s to RE. Context Free Grammars: Definition, Simplification of CFG. Pushdown Stack Memory Machines: Power of PDM over FSM. Universal TM.

UNIT-II

Operating Systems:

System calls, OS structure like monolithic, layered, kernel based, micro-kernel based. CPU Scheduling: algorithms and performance evaluation. Inter-process communication and synchronization needs: Mutual exclusion, semaphores. Deadlock: Principles, detection, prevention, avoidance and recovery. Virtual memory management: Concepts, implementation. File management: concepts, free space management. Security and protection: goals of security and protection, security and attacks,. System Programming: System software: Assemblers, Loaders, Compilers, Interpreters, Macros, Operating system and formula system, Translators. Compiler: Types, Overview of compilation process, Phases of compiler.

UNIT-III .

Software Engineering:

Planning and Managing Software projects: Metrics for software quality, Software Acquisition, Software risks, Monitoring Project Scheduling, Work break down structures, Project plan. Requirement Analysis: Communication Techniques, FAST, Quality deployment, Data flow Diagrams. Design Fundamentals: Software Design and software design process, Abstractions, Refinement and modularity. Software Testing Techniques and Strategies: Software testing fundamentals. Data Base Management Systems: Database administration issues: DBA role, Data dictionary, security, backups, Replication. Data modeling: Basic concepts, types of data models, E-R data model E-R and ERR diagramming. SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Transaction Management: Basic concepts of transaction, Different concurrency control protocols. Normalization: Need of normalization, Types of normalization. Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism.

UNIT –IV

Data Structures:

Data Structures: Stack Queue, Circular Queue, and Array. Fundamental operations on data structures. Applications of stack, Polish notations and interconversions. Linked List: Creation, insertion, deletion, traversing. Linked stack and linked queue. Binary tree, binary search tree, threaded binary tree, Huffman algorithm, height balanced tree. Algorithms: Algorithm analysis, complexity issues, designing algorithms. Divide and Conquer method: Binary search, merge sort, quick sort. Probabilistic analysis and randomized algorithms. Branch and Bound: Traveling salesman"s problem. Greedy Algorithms: Elements of greedy algorithms.

UNIT-V

Computer Networks :

OSI and TCP/IP reference models. Network Layer: Logical Addressing - IPv4 addresses-Address space, notations, Classful addressing, Classless Addressing, IPv6 addresses-Structure and address space, IPv6- Advantages over IPV4. Unicast Routing Protocols: Optimization, Intra and Inter domain routing, distance vector routing, link state routing, path vector routing. TCP: process to process communication, UDP, TCP/IP protocol suit, addressing. Congestion control: open- loop, closed- loop congestion control in TCP.

References:

1. C.L. Liu , " Elements of Discrete Mathematics", 2nd edition, TMH.
2. J. Treamblay , R. Manohar ," Discrete Mathematical structures with application to computer science" , TMH.
3. K.L.P.Mishra, „Theory of Computer Science", PHI.
4. E V Krishnamurthy, "„Theory of Computer Science", EWP.
5. Silberschatz, Galvin, Gagne, "Operating System Concepts", 7th Ed,Wiley India
6. D.M. Dhamdhere, "Operating Systems", Tata McGraw Hill, 2nd Ed.
7. John J. Donovan "System Programming", TMH.
8. Pressman, "Software Engineering", McGraw Hill, 6th Ed.
9. Henry F. Korth, Abraham silberschatz, "Database system concepts", 5th Ed.Mc Graw Hill Inc.
10. Singh, "Database Systems: Concepts,Design & Apllication"- Pearson LPE.
11. Ellis Horowitz and Sahani, "Fundamentals of data Structure" Galgotia.
12. Seymour Lipschutz, "Data Structures", Schaum"s Outline.
13. Thomas H. Cormen and charles E.L. Leiserson, " Introduction to Algorithm", PHI, 2nd Ed.
14. Aho , "Design & Analysis of Computer Algorithms"- Pearson LPE.
15. Andrew S. Tanenbaum, "Computer Networks", 4th edition, Pearson LPE /PHI.
16. Behrouz Forouzan,"Data Communications and Networking",TMH, 4th edition.

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Sri Satya Sai
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Ref. No.: SSSBoS/SOE/CA/01 Date: 25/06/2021

Name of Faculty: **School of Engineering**

Name of Department: **Department of Computer Application**

Minutes of Board of Studies Committee Meeting Dated on 25-06-2021

The Board of Studies Committee of Department of Computer Application was conducted a meeting in online mode through google meet at 2:30 PM. on 25-06-2021. Following members were present.

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
2. Dr. Uday Chourasia, UIT, R.G.P.V. Bhopal
3. Dr. Neeraj Sharma, Asst. Prof., Chairman
4. Dr. Harsh Pratap Singh, Asst. Prof., Member
5. Dr. Jitendra Sheetlani, Asst. Prof., Member
6. Dr Pankaj kawadkar, Asst. Prof., Member
7. Mr. Arif Hakeem, Asst. Prof., Member
8. Mr. Manoj Verma, Asst. Prof., Member
9. Mr. Harsh Lohiya, Asst. Prof. Member
10. Mr. Kailash Patidar, Asst. Prof., Member
11. Mr. Narendra Sharma, Asst. Prof., Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda were discussed and resolved.

Agenda:

Modification in syllabus of Ph.D (Computer Application) course work I & II.

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Ref. No.: SSSBoS/SoE/CA/01

Date: 25/06/2021

Discussion on Syllabus

Syllabus was put before the members as per AICTE guidelines, met the current demand in research areas, it was discussed in details by the members and some modifications were suggested.

Resolution of the Discussion:

It was resolved that Syllabus for course work follow AICTE guidelines and which also met the current demand in research areas, should be modified and may be accepted.

In course work-II, firstly Student will select their area of research. Based on this area, student will follow particular subjects and their syllabus.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Rajeev Pandey, UIT, R.G.P.V. Bhopal
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Chairman

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Research Methodology

Unit I:- Research Foundation:

Evolution of scientific inquiry and Research, definition, characteristics , types and objectives of Research, importance of Research methodology in scientific Research. Selection and formulation of Research problem. Research design: meaning of Research design, features of good research design , inductive, deductive, and development of models.

Hypothesis: Different types and significance, development of working Hypothesis, Null Hypothesis.

Unit II: - Review of Literature:

Meaning and Significance of review of literature, literature search procedure , sources of literature: primary and secondary sources, web source, critical literature review , Review Quality Instrument(RQI) .

Unit-III:- Data Collection And Analysis:

Data Collection Sources of data – primary, secondary and tertiary Types of data- categorical, nominal and ordinal methods of data collection: observations, field investigations, Direct studies: reports, record, or experimental observations.

Data analysis: graphical representation, descriptive analysis, inferential analysis, correction analysis and regression analysis. Measure of central tendency, measure of dispersion, measure of variation, Measure of central tendency vs measure of dispersion, normal distribution, measure of skewness and interpretation, purpose and use of chi-square test. Data analysis by using statistical software's: MATLAB, MINITAB and SPSS. Hypothesis Testing, generalization, interpretation and modeling.

Unit IV :- Scientific Writing And Ethics:

Scientific Writing: Structure and components of research paper and thesis writing. Different steps in the preparation: Layout, structure, language, illustrations, tables, citation styles and Bibliography.

Ethics: Ethical issue, Ethical committees, commercialization, copy right , royalty, intellectual property, rights and patent laws, plagiarism, citation, acknowledgement, Reproducibility and accountability

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Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

Statistics Introduction to Statistics - Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Mean, mode, median and Proportions.

References:

1. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition New Age International Publishers, New Delhi.
2. Sinha, S.C. and Dhiman, A.,2002. Research Methodology, Ess Ess Publications.2 volumes.
3. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons.New Delhi. 1470 p.
4. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
5. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
6. Research Methodology Dr PM Bulakh,Dr P. S. Patki and DrAS Chodhary 2010OPublished by Expert Trading Corporation Dahisar West, Mumbai 400068
7. Statistical method for Research works by fisher R.A. Cosmo publication, New Delhi ISBN : 81-307-0128-6
8. Design and analysis of experiments by montogomery D.C., john wiley ,ISBN: 0471260088
9. MINITAB online manual
10. Methodology of Research in Social Science by O.R. Krishnaswamy and Rangnatham, Himalaya Publication Hore, ISBN: 8184880936
11. SPSS online manual.

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SSSUTMS SEHORE (M.P.)

SUBJECT SPECIALIZATION-I
SUBJECT: COMPUTER APPLICATION

UNIT-I

Basics of Computer and Research: Brief history of computers, Generation of Computers, Characteristics of Computers, Computer memory, Basic computer organization; System software, Application software, introduction to operating system, single user, multi-user, multi-tasking single tasking, application of computer for Research, MS-windows, Linux.

UNIT-II

Computer organization: Introduction of hardware & software of computers, Memory organization: Memory Maps, Memory Hierarchy, Cache Memory -Organization and mappings. Associative memory. Virtual memory, Memory Management Hardware.

UNIT-III

Using Internet for Research: Internet, Intranet, Extranet, Website. Internet and its application: E-mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data, E-communication and E-collaboration. Research tools for better computing Internet, Use of E-Journals, Use of E-library, searching the keyword search engines.

UNIT-IV

Data processing tools & techniques for Research: Use of word processing, Research publishes tool- MS-Word, Graphics tool- MS-Excel, spreadsheet, MS-Power Point: Creating presentations and adding effects and database software. Plotting of graphs.

UNIT-V

Research Related Software's: software tools like MAT Lab, SPSS, PsiLAB or free ware tools. Data analysis software-SPSS: Definition, objectives and features, Data entry creating variables, switching to data labels,

References:

1. Fundamental of Computer By Pradeep K. Sinha.
2. Digital Logic and Computer Design | First Edition | By Pearson by Mano
3. A Hand Book of Methodology of Research – P. Rajammal and P. Devadoss, R. M. M. Vidya Press, 1976. 3. The Craft of Scientific Writing by Michael Alley, (Springer).
4. The Fundamentals of Computer Organization, Raja Rao, Scitech
5. Silberschatz ,"Operating system", Willey Pub.
6. Courter G. and Marquis A., "MS-Office 2000 – No Experience Required", BPB Publications.

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Date:-08/04/2021

Name of Faculty: **School of Engineering**

Name of Department: **Civil Engineering**

Minutes of Board of Studies Committee Meeting Dated on 08.04.21

The Board of Studies Committee of Department of Civil Engineering was conducted a meeting in online mode through Google meet at 12:00 PM. on 08.04.21. Following members were present.

1. Dr. Ajay Swarup	SSSUTMS, Sehore	Chairman
2. Dr. Nilesh Diwakar	SSSUTMS, Sehore	Internal member
3. Dr. G.M. Kapse	SSSUTMS, Sehore	Internal member
4. Dr .P.K. Agrawal	MANIT, Bhopal	External Member
5. Dr. Saleem Akhtar	UIT RGPV Bhopal	External Member

The Chairman of Board of Studies Committee welcomes and appreciated the efforts put up by the faculty for progress of the departmental activities. The following Agenda were discussed and resolved.

Agenda:

Modification in syllabus of Ph.D (**Civil Engineering**) course work I & II.

Discussion on Syllabus

Syllabus was put before the members as per AICTE guidelines met the current demand in research areas, it was discussed in details by the members and some modifications were suggested.

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Date:-08/04/2021

Resolution of the Discussion:

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In course work-II, firstly Student will select their area of research. Based on this area, student will follow particular subjects and their syllabus.

The Chairman thanks the members for peaceful conduction of meeting.

Signature of All members (Including Chairman)

1. Dr. Ajay Swarup	SSSUTMS, Sehore	Chairman
2. Dr. Nilesh Diwakar	SSSUTMS, Sehore	Internal member
3. Dr. G.M. Kapse	SSSUTMS, Sehore	Internal member
4. Dr .P.K. Agrawal	MANIT, Bhopal	External Member
5. Dr. Saleem Akhtar	UIT RGPV Bhopal	External Member

Chairman

Registrar
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SRI SATYA SAI

UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES
SEHORE (MP)

Research Methodology

Ph.D. Course Work (I) Syllabus

Research Methodology

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Unit-V:- Computer Applications and Statistics:

Computer Applications Application of computer in research, M.S. Office and its applications. Internet and its applications: E-mail, www, Web browsing, acquiring technical skills, drawing inferences from data.

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7. Statistical method for Research works by fisher R.A. Cosmo publication, New Delhi ISBN : 81-307-0128-6
8. Design and analysis of experiments by montogomery D.C., john wiley .ISBN: 0471260088
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11. SPSS online manual.

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SUBJECT SPECIALIZATION-I
SUBJECT- CIVIL ENGINEERING

UNIT I

STRUCTURAL ENGINEERING i) Engineering Mechanics: Resultant and equilibrium of coplanar force system, centroid and moment of inertia, friction. ii) Strength of Materials: Shear force and bending moment, simple stresses and strains, stresses in beams, direct and bending stresses. iii) Analysis of Structures: Fixed and continuous beams and simple frames – analysis using moment distribution method (without sway analysis).

UNIT II

WATER RESOURCES ENGINEERING i) Fluid Mechanics and Hydraulics: Fluid properties, fluid pressure, kinematics and dynamics of fluid flow, principles of conservation of mass, energy and momentum, Bernoulli's equation. ii) Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationship, runoff, hydrograph. iii) Irrigation: Duty, delta, water requirements of crops, introduction to dams and diversion headworks, introduction to canals and cross drainage works, types of irrigation systems, water logging and drainage.

UNIT III

ENVIRONMENTAL ENGINEERING i) Water Supply Engineering: Sources of supply, estimation of demands, water quality standards, introduction to primary and secondary treatments, conveyance and distribution of treated water. ii) Waste Water Engineering and Pollution control: Quantity, collection, conveyance, quality, disposal of sewage. Characteristics of sewage and its treatment. Sources and effects of air and noise pollutions, standards.

UNIT IV

TRANSPORTATION ENGINEERING: i) Classification of roads as per Indian Road Congress. Geometric design elements – camber, superelevation, transition curves, radius of horizontal curves, stopping sight distance, overtaking sight distance. Traffic engineering – traffic volume, origin destination surveys. ii) Geotechnical Engineering: Soil classification, geotechnical properties, shear stresses in soil, compaction and consolidation, bearing capacity. iii) Surveying: Principles and classification of surveys leveling, uses of theodolite, tacheometry, plane table survey, curves. Electronic Distance Measurement.

UNIT V

BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY : i) Bricks, cement, timber, concrete, steel. Principles of building planning. Foundation, brick masonry, framed, load bearing and composite structures, floors, doors and windows, roofs. ii) Concrete Technology: Properties of cement, aggregates, wet and hardened concrete. Factors affecting strength of concrete. Admixtures, concrete mix design by Indian Standard method. Introduction to Non-Destructive Test. iii) Construction Planning and Management: Elements of scientific management, management techniques and uses, material management, network analysis, safety in construction, quality control. Construction equipment's and methods.

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Reference Books

1- Hibbeler R.C., Mechanics of Materials (SI Units), Sixth Edition, Pearson.

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2- Unadcut Sanjeev, Engineering Mechanics, Techmax Publications, Pune.
3- Ramamrutham S., Strength of Materials, S. Chand & Bros., New Delhi.
4- Pandit & Gupta, Structural Analysis, Tata McGraw-Hill Publishing Company Ltd. New Delhi.
5- Prof. Shah V.L. & Prof. Karve S.R., Limit State Theory & Design, Pune Vidyarthi Publications.
6- Negi L.S., Design of Steel Structures.
7- Dr. Jain A.K., Fluid Mechanics, Khanna Publishers, New Delhi.
8- Dr. Subramanya K., Engineering Hydrology, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
9- Dr. Modi, Water Resources, Irrigation & Water Power Engineering, Standard Publishers, New Delhi.
10- Garg S.K., Water Supply Engineering, Khanna Publishers, New Delhi.
11- Punmia & Jain, Waste Water Engineering, Laxmi Publications (P) Ltd., New Delhi.
12- Pevy, Environmental Engineering, McGraw-Hill Publishing Company Ltd.
13- Basak Anindita, Environmental Studies, Pearson, Delhi.
14- Justo & Khanna, Highway Engineering.
15- Murthy V.N.S., Soil Mechanics & Foundation Engineering.
16- Kasmalkar S., Foundation Engineering.
17- Kanitkar T.P. & Kulkarni S.V., Surveying & Levelling Vol. I & II
18- Sushilkumar, Building Construction.
19- Gambhir M.L., Concrete Technology, TMH Pub. Co. Ltd., New Delhi.
20- Peurifoy R.L., Construction Planning and Management, TMH Pub. Co. Ltd., New Delhi.

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