DauDayal Institute of Vocational Education
Dr. Bhimrao Ambedkar University, Khandari Campus, Agra

A meeting of the Academic Committee of DauDayal Institute of Vocational Education, Dr Bhimrao University, Khandari Campus, Agra is being/has been held on 23rd & 24th June 2020 at DauDayal Institute of Vocational, Khandari campus, Agra.

The Following members were present:

1. Prof. Brijesh Kumar Singh, FET, RBS College, Bichpuri.
2. Dr. Anuj Parashar, FET, Agra College, Agra.
3. Prof. S.K. Jain, IET, Khandari Agra.
4. Dr. R.S. Sharma, DEI, Agra.
5. Dr. Tanveer Qamar, FET, Agra College, Agra.
6. Prof. B.S. Sharma, I.B.S, Khandari Agra.
7. Prof. H.C. Taneja, DTU, Delhi.
8. Prof. Agam Tyagi, DEI, Agra.
9. Prof. Sanjeev Kumar, I.B.S., Khandari Agra.
10. Prof. S.C. Sharma, DTU, Delhi.
11. Prof. O.P. Singh, Institute of Engineering and Technology, Lucknow.
12. Dr Bhoopendra Singh, Agra College, Agra.
13. Prof. C.K. Tiwari, HBTI, Kanpur.
14. Prof. Praveen Saxena, DEI, Agra.
15. Prof. Brijesh Rawat, SPCJI, Khandari Agra.
16. Prof. Manoj Kumar Srivastava, ISS, Agra
17. Prof. S.B. Sharma, DDIVE, Khandari Agra
18. Prof. S.C. Upadhyaya, DDIVE, Khandari Agra
19. Dr. Sanjeev Sharma, DDIVE, Khandari Agra
20. Dr. K.K. Pachauri, DDIVE, Khandari Agra
21. Dr. Kaushal Rana, DDIVE, Khandari Agra

The committee has taken following decisions unanimously:

1. The minutes of the academic committee of DauDayal Institute of Vocational Education held on 9th and 10th July 2010 have been confirmed.

2. The revised ordinances, course structure, syllabus and credit based weightage system (CBCS) of M.Sc. Electronics & Instrumentation have been discussed & approved. (Appendix I)

24.6.20

3. The ordinances, course structure and syllabus for B.Voc.(Renewable Energy [redacted]) course have been discussed and approved.(Appendix-II)

4. The ordinances, course structure and syllabus for B.Voc.(Marketing Management) course have been discussed and approved.(Appendix-III)

5. The ordinances, course structure and syllabus for P.G. Diploma in Electronics and Instrumentation(PGDEI) course have been discussed and approved.(Appendix-IV)

6. The ordinances, course structure and syllabus for Post Graduate Diploma in Computer Management(PGDCM) course have been discussed and approved.(Appendix-V)

7. The members of the Academic Committee was informed by the convener that the academic committee of the institute held on 7 Dec. 2008 had taken unanimous decision to establish a new faculty as Faculty of Vocational Education in the University which is also approved by the academic council resolution no 23/23 dated 19/12/2009 and executive council via resolution no. 3.01 dated 26/06 2010. This faculty will incorporate the following subjects :

S. No.	Subject
1.	Instrumentation
2.	Optical Instrumentation
3.	Computer Application
4.	Mathematics
5.	Advertising & Sales Promotion(Sales Management)
6.	Office Management and Secretarial Practices
7.	Tax Procedures and Practices
8.	Foreign Trade Practices and Procedure
9.	Geo-explorational and Drilling Technology
10.	Still Photography Audio Products
11.	Electronic Equipment Maintenance
12.	Computer Maintenance
13.	Electrical Equipment Maintenance
14.	Environment and Water Management
15.	Automobile Maintenance
16.	Refrigeration and Air-conditioning Maintenance
17.	Construction Technology Management
18.	Manufacturing Process

24.6.20

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The academic committee held on 9th and 10 July 2010 unanimously was of the view that this proposal must be sent to State Government through proper channel to establish the Faculty of Vocational Education. Now members of the committee are of the view to get the approval from the State Government in view of the current national trend for skill education.

Prof. Brijesh Kumar Singh	Dr. Anuj Parashar	Prof. S.K. Jain
Dr. R.S. Sharma	Dr. Tanveer Qamar	Prof. B.S. Sharma 24.6.20
Prof. H.C. Taneja	Prof. Agam Tyagi	Prof. Sanjeev Kumar
Prof. S.C. Sharma	Prof. O.P. Singh	Dr Bhoopendra Singh
Prof. C.K. Tiwari	Prof. Praveen Saxena	Prof. Brijesh Rawat
Dr. Sanjeev Sharma	Dr. K.K. Pachauri	Dr. Kaushal Rana
Prof. M. K. Srivastava DEAN Science	Prof. S.B. Sharma	Prof. S.C. Upadhyaya Director(DDIVE)

All the academic committee members were present

24.06.2020

REVISED ORDINANCES OF MASTER OF SCIENCE (M.Sc.) IN ELECTRONICS AND INSTRUMENTATION

(w. e. f. Academic Session : 2020-21)

1. The title of the M.Sc. course shall be M.Sc. (Electronics and Instrumentation). The Course shall be conducted by Dau Dayal Institute of Vocational Education (Dr. Bhimrao Ambedkar University), Agra.

2. The minimum qualification for admission to the M.Sc. (Electronics and Instrumentation) shall be Bachelor's degree (Three Year) with at least 50% marks in aggregate with Physics/Instrumentation/Optical Instrumentation/Mathematics/Statistics as one of the subject.

3. The admission of the candidate shall be based on academic merit and interview /written test.

4. The M.Sc. (Electronics and Instrumentation) course shall be of two years (divided into four Semesters) programme and based on Choice Based Credit System (CBCS). The first year of M.Sc. shall be known as M.Sc. (P) having I and II semesters. Similarly, second year of this course shall be called M.Sc. (F) having III and IV semesters. Each semester shall consist of minimum 90 working days.

5. The M. Sc. programme is spread over four semesters.The total marks assigned for this programme shall be 2000 and the credits earn will be of 80 credit points and comprises of three different components viz: I) Teaching and II) Lab Work / Field Work. Distribution of credits for M. Sc. Programme shell be as follows:

I) Teaching	= 48 credits
II) Lab work	= 18 credits
III) Job Training and project	= 14 credits

6. For each semester, there shall be three theory papers, in addition to laboratory work, and job training after successful completion of one year study.

7. The job training shall be supervised by the teacher concerned and Head of the Institute.

8. At the end of each Semester there shall be an End-Term Examination of three hours duration for each course and practical of six hours, based on prescribed courses taught during the Semester.

9. At least one question paper of each semester shall be set and examined by External Examiner and the remaining papers by the Internal Examiners. The practical examination at the end of each Semester shall be conducted by a Board of two examiners (one external and one internal examiner) jointly.

10. The examiners- external as well as internal shall be appointed by the Vice-Chancellor on the recommendation of the Head of the Department.

11. Each core or elective course in each semester shall be of 100 marks (4 credits). Out of these marks, 20 marks in each course shall be awarded on the basis of atleast two periodical tests to be conducted by the teacher concerned during the semester At end of each semester there shall be a term examination of each course and the same shall carry 80 marks. The practical examination shall be of 150 marks at the end of each semester. The marks shall be awarded jointly by the internal and external examiners on the basis of practical examinations, viva-voce and records.

12. The teachers teaching a particular paper or parts there of, shall provide in writing the details of the topics taught or to be taught in a given semester. These details along with syllabus and Questions Bank (if any) shall be sent to the examiner for setting the question paper.

13. In case of misbehavior, indiscipline, the student may be expelled from the Department or given some other punishment recommended by the faculty members of the Department / Proctor of the University and the decision of the unfair means committee of the university is final in the case of cheating and using unfair means by the student in any examination. All cases of expulsion shall be referred to the Vice-Chancellor for final approval.

14. Each student shall pay tuition, examination and other fees per semester/annual as University Orders.

15. (a) Each theory paper of the Course shall contain 8 (eight) questions spread uniformly over the entire syllabus. The students shall have to answer only 5 (five) questions in three hours, which shall be the duration of the question paper.
(b) A student must get at least 40% marks in each theory paper including periodical tests and assignment/seminars in each Semester. Further, he/she must get at least 40% marks in the practical examination. To pass the course the candidate should secure at least 50% marks in the aggregate.

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16. A student who fails or want to improve in theory paper/(s) or periodical test/(s) shall be given only one chance to reappear in that paper along with the next following batch. The chance to reappear shall be given only in not more than two courses in one Semester. The candidate shall, however be promoted to the next Semester. No separate examination will be conducted for such candidate.

17. If a candidate fails to appear in practical examination,a special practical examination can be conducted for the candidate on the deposition of fees as prescribed by the university as a special practical examination fees.

18. A student may appear as an Ex-student in the term/semester examination provided that :-

(a) He /She has completed all the semester examination,test and seminars butfailed in aggregate of all the semester examination.

(b) He /She has attended 50% of lectures, practical, appeared in tests andseminars and he/she has submitted the Medical Certificate with anapplication on the first day of the term/semester examination or prior to this.

19. If a candidate has secured 60% or more marks in the aggregate inall the four semester he/she will be placed in First division. If he/she secured 50% or more but less than 60% will be placed in Second division. If he/she secured less than 50% marks will be placed in Third division. If a candidate has secured 75% or more marks in the aggregate of all the four Semesterexaminations counted together, it shall be mentioned in his Degree that he has passed M.Sc. Examination with Distinction.

20. Every candidate will be required to have 75% attendance of the prescribed number of periods in each paper. Teaching/ Seminars/ Tutorial/ Library reading shall be of one-hour duration and will be counted as one attendance. Practical of 2-3 hours will also be counted as one attendance.

Exemption in the prescribed number of attendance may be granted by the Vice-Chancellor on the recommendation of the Head of the Department in case of following circumstances:

The student should be a sportsman or sportswoman who have participated in games upto the level of National/ Inter-University/ Camps/ Tournaments and Youth Welfare Activities.

Inspite of exemptions clarified above it will be compulsory for a candidate that he/she has attended at least 60% prescribed number of periods.

ANNEXURE – III

DAU DAYAL INSTITUTE OF VOCATIONAL EDUCATION, KHANDARI, AGRA
REVISED COURSE STRUCTURE AND SYLLABUS FOR
M. Sc.(ELECTRONICS AND INSTRUMENTATION)

Semester: I

Course – 1	Solid State Electronics
Course – 2	Digital Electronics and Microprocessors
Course – 3	Instrumentation Technology
Lab – I	Electronic Lab.

Semester: II

Course – 4	Network Analysis
Course – 5	Optical Instrumentation
Course – 6	Vacuum Instrumentation
Lab – II	Optical Instrumentation Lab.

On the Job Training(Six weeks)

Semester: III

Course – 7	Optolectronics
Course – 8	Communication Electronics
Course – 9	Power Electronics
Lab – III	Electronics and Instrumentation Lab.

Semester: IV

Course – 10	Biomedical Instrumentation
Course – 11	Nanomaterials and Nanotechnology
Course – 12	VLSI Circuits and Technology
Lab – III	Major Project

Registrar Dr. B.R.A. University, Agra

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Course – 1: Solid State Electronics

Electronic Transport in semiconductors. PN junction. Diode Equation and diode equivalent circuit. Barrier potential and characteristics of a PN junction, load line of a diode circuit, zener diodes, semiconductor diodes.

Construction of a junction transistor and its characteristics, load line and operating point, transistor parameters, Various transistor configurations and their equivalent circuits, FET, JEST, MOSFET.

Integrated circuits, Advantages and limitations of IC, classifications and fabrications of IC.

Rectifiers, Silicon controlled rectifier (SCR). Regulated power supply.

Principle and classification of amplifiers, single stage amplifier, Multistage amplifiers, Feedback in amplifiers, Frequency response in amplifiers.

Principle and classification of oscillators, Sinusoidal Oscillators, Non sinusoidal oscillators.

Elementary theory of filters, T and section filters, low, high and band pass filters.

Course – 2: Digital Electronics and Microprocessors

Number Systems and binary codes, logic gates, Boolean algebra and minimization techniques, Adders, Encoder and decoder, Multiplexers and demuliplexers. Digital logic families, Flip- Flops, Multivibrators and clock circuits, Shift registers, Counters A/D and D/A converters, Memories.

Introduction to microprocessors, Architecture of 8085 and 8086 microprocessors, Addressing modes, 8085 instruction set, 8085 interrupts, Programming, Memory and 1/0 interfacing, Serial communication protocols,

Introduction of micro controllers (8 bit).

Course – 3: Instrumentation Technology

Transducers – Resistance, Inductance, Capacitance, Piezoelectric, Thermoelectric, Hall effect, Photoelectric, Techogenerators, Measurement of displacement, Velocity, acceleration, force, torque, strain, speed and sound temperature, pressure flow humidity, thickness, pH –position.

Measuring Equipment – Measurement of R, L and C, Bridge and Potentiometers, voltage, current, power, energy, frequency/ time, phase, DVMs, DMMs, CRO, Digital storage oscilloscope, Logic probes, logic state analyzer, Spectrum analyzer, Recorder, Noise and Interference in instrumentation. Instrumentation amplifiers, Radio Telemetry.

Course – 4 :Network Analysis

Introduction: Review of ideal circuit elements, resistive networks, mesh and nodal analysis. Network Theorems linearity and superposition, Thevenin and Norton theorems, maximum power transfer, Wye-delta transformation, Tellegens theorem.

Transient Analysis: Laplace transform approach to solution of networks signals, transform impedances, first order systems, second order systems, state space techniques for formulation of equations and analysis.

Sinusoidal Steady and analysis: Phasers and Phase diagrams, voltage current phase calculation . Two port Networks Deviation of H, Y, Z, ABCD parameters, Inter – Parameters conversions.

Network Synthesis: Introduction to network synthesis, Test for positive real function, Hurwitz polynomials, passive RL, RC, LC network synthesis, Cauer Foster realizations.

Opto-electronics

Course – 5 Optical Instrumentation

Interference with white light, Thin film interference, Non-reflecting and high reflecting film, Localization of freinges, Michelson interferometer and its application multiple beam interference, Fabry perot interferometer, interference fillers.

Diffraction, Fraunhofer diffraction examples in narrow slit rectangular aperture and circular aperture, limit of resolution, diffraction grating, fresnel diffraction, zone plate. Gaussian beam propagation.

Polarization: Production of polarized light, Double refraction, Circular and elliptical polarization, retarders and wave plate analysis of polarized light, optical activity, Dichroism, polarizing prisms (Nicol, Wollaston Rochon Glan – Thomson etc. polaroids photo elasticity).

Optical Components and then characteristics:

Plane mirror, achromatic prism, direct vision prisms, Right angle prisms roof prism, erecting prism system, cube corner prism, beam splitter, cubes, curved mirror, lenses, ophthalmic lenses..

Optical material and fabrication techniques:

Optical glasses and their characteristics, crystalline materials.

Optical machinery:

Grinding, polishing, drilling, trepanning, spherical curve generator optical tools, abrasives and materials.

Making optical components:

Flates, mirrors, parallel plates lenses, prism and polishing crystals.

Optical instrumentation & testing optical components:

Newton's interferoscope, fizeaue interferometers, twyman- green interferometers, Mach – Zehnder interferometer, multiple beam interferometers, fabry – perot interferometers, polarization interferometers, shearing interferometers, autocollimeter.

Compound microscope, binocular microscopes, projection microscopes, binoculars, telescopes, terrestrial and astronomic, profile projectors, theodolites, spectrometer.

Course – 6 : Vacuum Instrumentation

Fundamental, gas flow mechanisms, conductance, calculations concepts of through put and pumping speed.

Rotary roots and oil free pumps, diffusion and sorption pumps, turbo molecular cryo and ion pumps.

Pressure measurement by hydrostatic, thermal conductivity and ionization gauge, gauges calibration using spinning rotor, diaphragm and mecleod gauges.

Vacuum components traps, baffles, valves, seals and feedthroughs.

Vacuum material and fabrication techniques:

Leak detection techniques, mass spectrometer and residual gas analysis.

High vacuum systems design:

Thin film deposition techniques, thermal evaporation and modification, sputtering techniques, advantages and limitations and various modifications.

Course –7: Opto Electronics

Laser Instrumentation: Basic theory, types of lasers and their characteristics, mode locking an Q-switching , He – Ne, Ruby, Nd-YAG, carbon dioxide, argon ion semiconductor etc. lasers, application science and industry, laser safety & Holography, NDT.

Optical fibers: Light propagation in fiber, types of fiber, characteristics parameters, modes, fiber splicing, fiber optic communication system – coupling to and from the fiber, modulation, multiplexing and coding , repeaters, bandwidth and rise time budgets.

Optical sources – LED, Photo detectors – p-n photodiode, PIN photodiode, phototransistors, optocouplers, solar cells, display devices.

Optoelectronic instrumentation basics of electronic specification and identification of components basic circuits for LEDs, laser diodes and photo detectors LCDs, photomilitplier tubes, etc.

Advanced instruments (Including laser based instruments) laser alignment system, laser centering devices, bar scanners, laser printers, rangefinders, guns sight night vision equipment, image tubes.

Microwave

Course – 8: Communication Electronics

Review of Electromagnetic, Maxwell's equations, Time varying field, wave equation and its solution, Plane wave Equation, pointing vector.

Basic principles of amplitude modulation, frequency modulation and phase modulation, Demodulation.

Random signals and noise, External and internal noise, noise temperature and noise figure.

Radio Transmitters and Receivers, Classifications and applications of transmitters and receivers.

Transmission lines-types and parameters, Transmission line equation, Input and output impedances, Characteristic impedance, Reflection coefficient and VSWR, Smith Chart-types and applications.

Basic concept of guided waves, Types of wave guides, Transmission line analogy for wave guides, Propagation phenomenon in different types of wave-guides.

Antenna action, Types of antenna, Fundamental parameters of antenna, antenna measurements.

Course –9: Power Electronics

Characteristics of solid state power devices- SCR, Triac, UJT, Triggering circuits, converters, choppers, inverters AC regulators, Speed control of a.c. and d.c. Motors. Stepper and synchronous motors, three phases controlled rectifier, switch mode power supply, uninterrupted power supply.

Course 10 – Biomedical Instrumentation

Analytical Instruments:

Working principals operation and data analysis of the following instruments, spectrophotometer, electron icroscopes.

Nuclear magnetic resonance spectrometer:

Principles of operation, sample preparation and data analysis, stability of magnetic fields and electronics.

Mass spectrometer, Application area, working, principles of static dynamic instruments analysis of data.

X-ray and techniques and their application to radiography fluorescence and diffractometry, interpretation of data.

Mossbauer spectrometer: Principles of operation, measurements of radioactivity, analysis of data.

Introduction to transducer and their application recording electrodes EEG, ECG, and other potentials, working principles and precaution. Blood pressure measurement, introduction to hemodynamics, introduction to ultrasound and tomographic techniques, interpretation of data and precaution for measurements.

Introduction of working principle and operation of pacemakers, delibrillators, heart lung and other ICU instrumentation.

Course – 11: Nanomaterials and Nanotechnology

Introduction: Nanotechnology, Insights and intervention into the Nanoworld, Building Blocks of Nanotechnology, Types of Nanotechnology & Nanomachines, Applications of Nanotechnology in different fields(Sensors, Solar Cells, PEC Cells), Emerging areas of Nanotechnology.

Nanomaterials

Overview: Nanoparticles, Origin, significance and applications, Health issues, Cost ,The evolution of today's industry for manufacture of carbon blacks, fumed silica, pigmentary titania, ZnO, filamentary nickel, optical fibers and, most recently, for metallic and ceramic and polymeric nanoparticles. Pros and cons of current processes: Flame hot-walls plasmas, Lasers.

Instrumentation Techniques for Nanotechnology

Molecular Nanotechnology- Low Energy Electron Diffraction (LEED), Scanning Probe Microscopy-principle of operation, instrumentation and probes, Low temperature Scanning Probe Microscopy, Auger, SEM, TEM, XRD (Powder/Single crystal), Atomic Forse Microscopy (AFM), Scanning Tunneling Microscopy (STM), EDAX, XRF, ESCA, , UPS (UV Photo electron spectroscopy), Ellipsometry, Nanodots, self assembly and Nanolithography. Physical methods such as various forms of spectroscopy for the analysis of biological systems- Force spectroscopy, XPS, X-ray Photon Spectroscopy, EDS, Electron Dispersion Spectroscopy etc.

Carbon Nanotubes: An introduction to the elementary properties of Carbon Nanotubes, structure current status of the scientific research on Carbon Nanotubes, Synthesis Methods , properties, Characterization Methods & CNT Based Materials

Reference Books:

1. Bhushan Bharat, 2004, Hand Book of nanotechnology, Springer.
2. Yuri Eogotsi, Nanomaterials : A Hand Book, Taylor & Francis (NY)
3. Kohler,M., Fritzsche, W. 2005, Nanotechnology- An Introduction to Nanostructuring Techniques, Willey- VCH Verlag
4. Reehard Booker and Earl Boysen, Nanotechnolgy, Willey

Course – 12: VLSI Circuit and Technology

MOS-Technology: Basic MOS transistors, MOS technology and VLSI, NMOS and CMOS technology, thermal aspects of processing, Fine line lithography, Dry, etching, Silicon gate and silicates, Isolation in MOS-VLSI.

Circuit Properties of Mosfets: Drain current-voltage relation, transconductance, Maximum operating frequency, Control of threshold voltage, Pass transistor, NMOS-inverter, Aspect ratio, Pull up to pull down ration, CMOS inverter, Equivalent circuit of MOSFET, Latch up in CMOS circuits.

MOS circuit design processes: MOS layers, Stick Diagrams, design rules and layout.

Scaling of MOS- Circuit: The sealing factor, Generalized sealing theory, Limitation of sealing, Sealing of Wires and interconnections, Latch –up in sealed CMOS- circuits.

Recommended Books:

1. Sze, S.N., "VLSI technology" McGrah Hill Co. 1998.
2. Mead C., Conway, L. "Introduction to VLSI Systems" Addition Wesley 1980.
3. Parknell, D.A.E. Schraghian K, "Basic VLSI Design Systems & Circuits" PHI 1989.