RGPV(DiplomaWing)Bhopal	SEMESTERTEACHINGLEARNING&ASSESSMENTPLAN	FORMAT-6

NAMEOF PROGRAMME	THREEYEARSDIPLOMA	SCHEME	OBE	IMPLEMENTINGYEAR	2021-22

BRANCHCODE	E05	NAMEOF BRANCH	*ELECTRICAL&ELECTRONICSENGINEERING*	SEMESTER	SIXTH

S. No	COURSEDETAILS					T-LPLAN		ASSESSMENTPLAN								
	COURSE CODE	COURSE NAME	PAPER CODE	No. of COs	No. of LOs	Total T-L Hrs.	T-L Hrs. /Week	Internal Assessment		ExternalAssessment(UniversityExam)						Grand Total of Marks
										TheoryPaper			PracticalExam*			
								No.of Los (T+P)	Total Marks	No.of LOs	Total Marks	Duration	No.of LOs	Total Marks	Duration	
1	601	INSTRUMENTATION	6862	05	15	120	08	03+02	30+20	07	70	3Hrs.	03	30	3Hrs.	150
2	602	UTILIZATIONOF ELECTRICALENERGY&TRACTION	6855	05	15	120	08	03+02	30+20	07	70	3Hrs.	03	30	3Hrs.	150
3	603	ELECTRICAL & ELECTRONICSPROJECT		03	7	105	07	04	120	-	-	-	03	80	3Hrs.	200
4	611/ 612/ 613	RENEWABLE ENERGY TECHNOLOGY / INDUSTRIAL DRIVE/ CONSUMERELECTRONICS	6856 6857 6835	05	14	90	06	04+02	30+20	07	70	3Hrs.	02	30	3Hrs.	150
								03+02		07			03			
								03+02		07			02			
6	605	PROFESSIONAL DEVELOPMENT-VI		03	06	60	04	06+00	75+00	-	-	-	-	-	-	75
TOTAL				-	-	495	33									
No.ofTheoryPapers													**No.ofPractical Exams**			

ExamforLOs(Psycho+ Affect.),
#3hoursperweekfor selflearning/libraryetc.
*****Forproject'sexternalassessment, maximum30studentsonlyshouldbeassessedbyoneexternalexaminerinasingleday.***

RGPV (DIPLOMAWING) BHOPAL	OBE CRRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/6

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	601	Paper code		Subject	Instrumentation

CourseOutcome1	Use various transducers for measurement of physical quantities.	Teach Hrs	Marks
Learning Outcome E0560111	Identify functional elements of instrumentation system, performance characteristics and classify transducers. *(Cognitive domain)*	**7**	**10**
Contents	• Instrumentation System: Elements, Block Diagram & their functions • Static & dynamic characteristics, Noise, S/N ratio & Noise factor • Transducers: Definition and classification, Electrical transducers, Advantages of electric transducers. • Classification of Electrical Transducer: Active and passive transducers, Resistive, inductive and capacitive transducers. Analog and Digital transducer.		
Method of Assessment	*Internal: Mid Semester Exam-I, Pen paper test & Assignment.*		
Learning Outcome E0560112	Compare various transducers based on their construction, working & application. *(Cognitive domain)*	**9**	**12**
Contents	• Resistive Transducer: Potentiometric, Metallic and semiconductor strain gauges, RTD and Thermistor. • Inductive Transducer: Self Inductance type, LVDT and applications. • Capacitive Transducers: Principle of operation, Differential arrangement, characteristics, advantage, disadvantage and applications. • Active Transducers: Thermocouples, Piezo-Electric transducers. Hall effect transducers and their application. • Opto-electronic transducers: photo voltaic, photo conductive, photo emissive transducers and Optical encoders.		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E0560113	Apply various transducers for measurement of physical quantities. *(Psychomotor domain)*	**8**	**10**
Contents	• Measurement of linear displacement by LVDT and draw its characteristics. • Measurement of temperature by RTD. • Measurement of temperature by Thermocouple.		
Method of Assessment	*External: Laboratory observation and viva voce*		

RGPV(DIPLOMAWING) BHOPAL	OBE CRRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/6

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	601	Paper code		Subject	Instrumentation

CourseOutcome2	Illustrate signal conditioning system for data manipulation.	Teach Hrs	Marks
Learning Outcome E0560124	Identify various signal conditioning system for data manipulation. *(Cognitive domain)*	**8**	**10**
Contents	• Signal conditioning: Need, Block diagram of AC and DC systems • Instrumentation Amplifier: characteristics, three amplifier configuration. • DC Amplifier, Chopper Amplifier. • Operational amplifier: Use of Operational amplifier in instrumentation (inverter, comparator, adder, subtractor, multiplier, divider, integrator and differentiator. • A/D converter: Successive approximation and dual slope. • D/A converter: Binary weighted and R-2R ladder network methods		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E0560125	Interpret function of Data Acquisition System and Data logger. *(Cognitive domain)*	**8**	**10**
Contents	• Data Acquisition System: Introduction, generalized block diagram, single and multi-channel DAS • Microprocessor: Introduction, basic concept, block diagram. • Data logger: Introduction, Block diagram, microprocessor based data logger.		
Method of Assessment	*Internal: Mid Semester Exam-II, Pen paper test & Assignment*		
Learning Outcome E0560126	Use various signal conditioning devices for data manipulation and conversion. (Psychomotor domain)	**8**	**10**
Contents	• Use of Operational amplifier for data manipulation. • Demonstration of analog to digital converter. • Demonstration of digital to analog converter.		
Method of Assessment	*Internal: Laboratory observation and viva voce*		

RGPV(DIPLOMAWING)B HOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 3/6

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	601	Paper code		Subject	Instrumentation

Course Outcome 3	Apply various transducers for measurement of non-electrical quantities.	Teach Hrs	Marks
Learning Outcome E0560137	Use various transducers for measurement of non-electrical quantities. *(Cognitive domain)*	**8**	**10**
Contents	• Flow Measurement: Electromagnetic flow meter and ultrasonic flow meter. • Level Measurement: Float & potentiometer type, Resistive, Capacitive and ultrasonic method. • Force & Torque Measurement: Electronic weighting system (Block Diagram), stress & deflection type torque measurement. • Humidity Measurement: Absolute and Relative humidity (definition only), Resistive hygrometer.		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E0560138	Utilize various transducers for measurement of non-electrical quantities. *(Cognitive domain)*	**8**	**12**
Contents	• Pressure Measurement: Classification, Pressure actuators(bellow bourdon tube & diaphragm gauge). Resistive, inductive and capacitive methods. • Low Pressure measurement: Pirani gauge and thermocouple gauge. • Speed Measurement: Contact and non-contact type tachometers, Photo-electric and Reluctance pick up tachometer, stroboscopic method of speed measurement and Digital tachometers (LDR type). • Vibration Measurement: Concept of vibration measurement, LVDT type and Piezo-electric type accelerometers. • Temperature Measurement: Radiation & optical pyrometers. • pH Measurement: Definition of pH value and pH scale, pH cell.		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E0560139	Measure non-electrical quantities using various transducers. *(Psychomotor domain)*	**8**	**12**
Contents	• Measurement of Liquid level using Resistive/Capacitive methods. • Measurement of temperature by optical pyrometer. • Measurement of speed by stroboscope. • Measurement of pH value by pH meter.		
Method of Assessment	*External: Laboratory observation and viva voce*		

RGPV(DIPLOMAWING)B HOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/6

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	601	Paper code		Subject	Instrumentation

Course Outcome 4	Identify the need, principles and various techniques of telemetry system.	Teach Hrs	Marks
Learning Outcome E05601410	Illustrate telemetry systems used in instrumentation *(Cognitive domain).*	**8**	**8**
Contents	• Telemetry system: voltage, current, position (potentiometer and synchros), frequency & pulse Telemetry. • Frequency Telemetry system: modulation & demodulation, A.M., F.M. & Phase Modulation. • Pulse Telemetry system: analog pulse telemetry system (PAM, PFM, PDM, PPM, PCM).		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E05601411	Classify telemetry channels and multiplexing systems. *(Cognitive domain)*	**8**	**12**
Contents	• Wire line, Radio channel & Microwave Channels and Concept of Optical Fiber Channels. • Multiplexing system: Need, types (TDM & FDM), block diagram & functioning with applications & limitation. • Pulse Code Format used in Digital Data Transmission. • Various techniques used in digital data transmission (ASK, FSK, PSK). • Concept of Digital Multiplexer, Digital Multiplexer & De multiplexer.		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E05601412	Demonstrate TDM, FDM and position telemetry. *(Psychomotor domain)*	**8**	**10**
Contents	• Demonstrate working of time division multiplexing. • Demonstrate working of frequency division multiplexing. • Use of synchros for position telemetry system by measuring error voltage.		
Method of Assessment	*Internal: laboratory observation and viva voce.*		

s

RGPV(DIPLOMAWING) BHOPAL	OBE CRRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/6

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	601	Paper code		Subject	Instrumentation

Course Outcome 5	Identify display devices and recorders for various applications.	Teach Hrs	Marks
Learning Outcome E05601513	Illustrate construction, working and applications of various display devices. *(Cognitive domain)*	**8**	**10**
Contents	• Introduction to digital display devices, seven segment and dot matrix display, construction, working and applications of LED, LCD and OLED display devices. Concept of 3½, 4½ digits. • Concept of touch screen display, types, resistive and capacitive touch screen display.		
Method of Assessment	*Internal: Assignment and Quiz*		
Learning Outcome E05601514	Classify recorders and describe their construction, working and applications. *(Cognitive domain)*	**8**	**6**
Contents	• Recorders: Necessity and Classification. • Analog recorders: Construction, working and applications of ultraviolet, X-T and X-Y recorders. • Digital recorders: Introduction and uses of Bar code and QR (quick response) readers and recorders (optical).		
Method of Assessment	*External : End Semester Theory Exam - Pen paper test*		
Learning Outcome E05601515	Apply various recorders for given applications.*(Psychomotor domain*)	**8**	**8**
Contents	• Demonstration of X-T (strip chart) recorders. • Demonstration of X-Y recorders. • Use Bar code, QR readers and recorders.		
Method of Assessment	*External: Laboratory observation and viva voce*		

REFERENCE BOOKS:

S.N.	Title & Publication	Author

1	Electrical and electronics measurement and Instrumentation, Dhanpat Rai & Co, Delhi, ISBN: 8177001000	Sawhney, A. K.

2	Instrumentation Devices and Systems, Tata McGraw Hill Education, New Delhi, ISBN: 978-0-07-463350-2	Rangan, C. S., Sharma, G. R. and Mani, V. S. V.
3	Instrumentation Measurement and Analysis, Tata McGraw Hill Education, New Delhi, ISBN: 978-0-07-015127-7	Nakra, B. C. and Chaudhry, K. K.
4	Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall India Publication, New Delhi	Helfrick, A. D. and Cooper, W. D.
5	Electronic Instrumentation and Measurement, Technical Publication, Pune. ISBN: 9350381265	Bakshi, U. A., Bakshi, A. V. and Bakshi, K. A.

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	VI

Course Code	602	Course Name	Utilisation of Electrical Energy & Traction

Course Outcome 1	Elaborate concept of illumination.	Teach Hrs	Marks
Learning Outcome **E0560211**	Define various illumination terminologies and describe laws of illumination. **[Cognitive Domain]**	**08**	**10**
Contents	• Electromagnetic wave spectrum. • Various terminologies: solid and plane angle, Luminous flux, Luminous intensity, Lumen, Illumination, Candle power (mean horizontal CP and mean spherical CP), Lamp efficiency, Brightness (or luminance), Specific consumption, Space height ratio, Utilization factor, Maintenance factor, Absorption factor, Reflection factor, Depreciation factor, Waste light factor, Polar curves. • Inverse square Law and Lambert's Cosine law. Numerical problems.		
Method of Assessment	External: End Semester theory examination. (Pen paper based)		
Learning Outcome **E0560212**	Describe working and applications of given lamps. **[Cognitive Domain]**	**08**	**10**
Contents	• Working, fitting and applications of following lamps with the help of circuit diagram: Incandescent lamp, Fluorescent lamp, CFL, Sodium Vapour lamp, Mercury Vapour lamp, LED lamp, Metal Halide lamp. • Electronic Ballasts. • Stroboscopic effect.		
Method of Assessment	Internal: Mid Semester – 1 theory exam. (Pen paper test)		
Learning Outcome **E0560213**	Evaluate brightness with the help of lux meter. **[Psychomotor Domain]**	**08**	**10**
Contents	• Measure lux level (Brightness) at different locations of institute and compare it with standards. • Make a chart of luminous efficacy (Lumen/watt) of different lamps.		
Method of Assessment	External: End semester practical exam. (Performance of task & viva voce)		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	V
Course Code	602	Course Name	Utilisation of Electrical Energy & Traction

Course Outcome 2	Utilize the concept of electrical heating and welding.	Teach Hrs	Marks
Learning Outcome **E0560221**	Explain electrical heating. **[Cognitive Domain]**	**08**	**10**
Contents	• Advantages and disadvantages of electrical heating. • Various requirements of heating material. • Causes of failure of heating elements. • Methods of temperature control. • Working principle of induction heating: core type and core less type, construction and use of Ajax Wyatt furnace. • Working principle of dielectric heating and its applications. Numerical Problems.		
Method of Assessment	External: End semester theory examination. (Pen paper based)		
Learning Outcome **E0560222**	Illustrate electrical welding. **[Cognitive Domain]**	**08**	**10**
Contents	• Classification of electric welding: Resistance welding, Arc welding and Radiation welding. • Desirable qualities of a good weld. • Probable defects of weld. • Principle and application of Resistance welding, types of resistance welding: Butt welding, Seam welding, Spot welding and Projection welding. • Principle and application of Arc welding. • Principle and application of Radiation welding. • Electronic circuit for welding: Block diagram.		
Method of Assessment	External: End semester theory examination. (Pen paper based)		
Learning Outcome **E0560223**	Prepare an electric weld specimen and demonstrate induction heating. **[Psychomotor Domain]**	**08**	**10**
Contents	• To prepare a job specimen using butt joint welding. • To prepare a job specimen using seam/ spot welding. • To demonstrate induction heating.		
Method of Assessment	External: End semester practical exam. (Performance of task & viva voce)		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 3/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	V

Course Code	602	Course Name	Utilisation of Electrical Energy & Traction

Course Outcome 3	Select various electrical drives and domestic appliances.	Teach Hrs	Marks
Learning Outcome **E0560231**	Explain the concept of an electrical drive. **[Cognitive Domain]**	**09**	**10**
Contents	• Block diagram of an electric drive system. • Merits and demerits of electric drive. • Types of electric drive: Individual, group and multi-motor drive. • Factors governing the selection of motor in an electric drive. • Motors suited for specific application: paper industry, cranes & hoist work, elevators, printing press, textile industry, rolling mills, cement plant, electric traction, refrigeration and air-conditioning, lathe & grinding, washing machine, electric vehicle, flour mill, vacuum cleaner, fan (ceiling, table and exhaust), lawn mower, toys, concrete vibrator, cooling fan of computer CPU, electric trimmer, mixer grinder/ juicer. • Load equalization: use of fly wheel. • Servomotor drive: Block diagram and application.		
Method of Assessment	External: End semester theory examination. (Pen paper based)		
Learning Outcome **E0560232**	Describe various domestic electric appliances. **[Cognitive Domain]**	**07**	**10**
Contents	• Operating principle and working using block diagram of following appliances: electric iron, electric toaster, electric water heater, fan (ceiling and table), microwave oven, washing machine, mixer/juicer/grinder, vacuum cleaner, air conditioner, flour mill, dish washer, lawn mower.		
Method of Assessment	Internal: Mid semester –2 theory exam. (Pen paper test)		
Learning Outcome **E0560233**	Demonstrate the performance of servo motor control and given domestic electric appliances. **[Psychomotor and Affective Domain]**	**08**	**10**
Contents	• To demonstrate the performance of servo motor control. • To demonstrate the performance of lawn mower/ room heater/ vacuum cleaner.		
Method of Assessment	Internal: Performance of task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	V

Course Code	602	Course Name	Utilisation of Electrical Energy & Traction

Course Outcome 4	Build the concept of electric traction.	Teach Hrs	Marks
Learning Outcome **E0560241**	Outline the general description of electric traction and track electrification. **[Cognitive Domain]**	**09**	**10**
Contents	• Electric traction: Desirable features of ideal traction system, advantages and disadvantages of electric traction. • Various systems for track electrification: D.C. traction system, 1ϕ A.C. system, 3ϕ A.C. system. • 25 kV A.C. 50 Hz system: Significance, advantages and disadvantages. • Traction mechanics: speed-time curves for train movement, simplified speed-time curves. [Derivation and Numerical]		
Method of Assessment	External: End Semester theory examination. (Pen paper based)		
Learning Outcome **E0560242**	Infer electric locomotive, traction motors and braking. **[Cognitive Domain]**	**07**	**10**
Contents	• Block diagram of A.C. electric locomotive. • Overhead equipment. (OHE) • Catenary construction: simple, modified and compound. • OHE supporting structure. • Current collection system: Pole collector, bow collector, pantograph collector. • Desirable features of traction motor. • Requirement and Types of electric braking: Rheostatic, Plugging and Regenerative.		
Method of Assessment	Internal: Quiz and Assignment.		
Learning Outcome **E0560243**	Identify the components used in traction sub-station and locomotive. **[Psychomotor Domain]**	**08**	**10**
Contents	• To visit traction sub-station/ locomotive shed and prepare a report.		
Method of Assessment	Internal: Performance of task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	V

Course Code	602	Course Name	Utilisation of Electrical Energy & Traction

Course Outcome 5	Analyze the significance of power factor improvement.	Teach Hrs	Marks
Learning Outcome **E0560251**	Explain causes and effects of low power factor. **[Cognitive Domain]**	**08**	**10**
Contents	• Significance of power factor. • Causes of low power factor. • Effects of low power factor. • Standard power factor of common electrical equipment like tube light, ceiling & exhaust fan, Induction motor, refrigerator/ freezer, washing machine, mercury vapor lamp.		
Method of Assessment	External: End semester theory examination. (Pen paper based)		
Learning Outcome **E0560252**	Identify importance and methods of power factor improvement. **[Cognitive Domain]**	**08**	**10**
Contents	• Advantages of power factor improvement. • Methods of improving power factor: by using static capacitors, by using synchronous condenser, by using phase advancer. • Advantages and disadvantages of above said methods of power factor improvement. • Incentives & penalties of power factor improvement for different consumers. • Determination of most economical power factor: constant kW consumption and constant kVA consumption. Numerical Problems.		
Method of Assessment	External: End Semester theory examination. (Pen paper based)		
Learning Outcome **E0560253**	Analyse power factor improvement using shunt capacitors. **[Psychomotor and Affective Domain]**	**08**	10
Contents	• To demonstrate the improvements in power factor by employing shunt capacitors. • To perform a case study on power factor improvement of Institute or Industry or sub-station.		
Method of Assessment	External: End semester practical exam. (Performance of task & viva voce)		

REFERENCE BOOKS:

S.N.	Name of Book, Publication, ISBN	Author	Publication/ Publisher
01.	Electrical Utilization and Traction	M. Rajalingam	Premier Publishing House, Hyderabad
02.	Utilisation of Electric Energy	E. Openshaw Taylor	University Press 1961
03.	Art and Science of Utilization of Electrical Energy	H. Partab	DhanpatRai and Sons, New Delhi 1986
04.	Utilization of Electric Power and Electric Traction	J. B. Gupta	S. K. Kataria and Sons
05.	Utilisation of Electric Power	Er. R. K. Rajput	Laxmi
06.	Modern Electric Traction,	H. Partab	DhanpatRai and Sons/ Vijay
07.	Utilisation of Electrical Energy and Traction	J. B. Gupta, Rajiv Manglik and Rohit Manglik	S. K. Kataria and Sons
08.	Utilization of Electrical Power and Electric Traction	G. C. Garg	Khanna Publishers
09.	Utilization of Electrical Power including Electric drives and Electric Traction	N. V. Suryanarayana	New Age International (P) Limited, Publishers 1996
10.	Generation Distribution and Utilization of Electrical Energy	C. L. Wadhwa	New Age International (P) Limited, Publishers 1997

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	611	Course Name	Renewable Energy Technologies

Course Outcome - 1	Apply concepts of energy conservation, management and audit.	**Teach Hrs**	**Marks**
Learning Outcome E0561111	Describe energy scenario and environmental issues. **[Cognitive Domain]**	**03 Hrs**	**05 Marks**
Contents	• Energy Scenario: Energy demand and supply (Global and National). • Type of energy sources: Primary and secondary, renewable and non-renewable. • Environmental issues: Global warming, climate change. • Need for sustainable energy sources.		
Method of Assessment	Internal: Mid semester- I theory examination (Pen paper test).		
Learning Outcome E0561112	Infer energy conservation act and explain energy management and audit. **[Cognitive Domain]**	**04 Hrs**	**05 Marks**
Contents	• Energy conservation act-2001 and its salient features. • Energy managements and its objectives. • Energy audit: Need, types and energy auditing instruments. • Energy audit report format.		
Method of Assessment	Internal: Mid semester- I theory examination (Pen paper test).		
Learning Outcome E0561113	Choose energy efficient equipment, energy conservation methods and analyse economic feasibility. **[Cognitive Domain]**	**7 Hrs**	**10 Marks**
Contents	• Energy efficient equipment: Electric motor, transformer. • Star ratings systems, Co-generation systems, heating ventilation and air conditioning systems, Waste heat recovery system. • Estimation of energy bills. • Economic analysis: Payback period (PBP), Net present value (NPV), Internal rate of return (IRR).		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561114	Analyse electricity bill and perform energy audit for a given building. **[Psychomotor & Affective Domain]**	**06 Hrs**	**10 Marks**
Contents	• To analyse electricity bill of educational institution for optimising it as per energy consumption patterns. • To perform energy audit of a given building.		
Method of Assessment	Internal: Performance of task and viva voce.		

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth
Course Code	611	Course Name	Renewable Energy Technologies

Course Outcome -2	Use solar PV module for various applications.	**Teach Hrs**	**Marks**
Learning Outcome E0561121	Describe solar radiation and solar energy systems. **[Cognitive Domain]**	**06 Hrs**	**10 Marks**
Contents	• Introduction to solar energy. • Solar radiation: Solar spectrum, radiation on the earth surface, direct, diffuse and global, solar insolation, annul variation in solar radiation, optimal tilt for solar radiation. • Solar-photovoltaic (SPV) and solar-thermal systems.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561122	Explain fundamentals of solar cell, module and arrays. **[Cognitive Domain]**	**8 Hrs**	**15 Marks**
Contents	• Solar cell – types, working. • Solar PV module: Types, rated power and actual power from module, standard test condition (STC). • Curve: I-V and P-V curve and module parameters. • PV module ratings and cost. • Blocking and bypass diode. • PV arrays. • Numerical problems on arrays.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561123	Perform experiments on solar PV module. **[Psychomotor & Affective Domain]**	**09 Hrs**	**15 Marks**
Contents	• To draw I-V and P-V curve of a solar PV module. • To draw I-V and P-V curve for series and parallel combinations of solar PV module. • To draw I-V and P-V curve for different tilt angle of solar PV module and find the optimum tilt angle. • To demonstrate shadow effect on solar PV module.		
Method of Assessment	External: Performance of task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 3/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	611	Course Name	Renewable Energy Technologies

Course Outcome –3	Classify power conditioning devices and solar PV power plant.	**Teach Hrs**	**Marks**
Learning Outcome E0561131	Define battery parameters and power conditioning devices used in solar PV system. **[Cognitive Domain]**	**6 Hrs**	**10 Marks**
Contents	• Batteries: Types, parameters, state of charge and depth of discharge. • Working with block diagram: Solar Inverter, PWM Charge Controller, MPPT Charge Controller.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561132	Compare different solar PV power plant. **[Cognitive Domain]**	**6 Hrs**	**10 Marks**
Contents	• Block diagram, functioning and application: ➢ Standalone solar PV system. ➢ Net metering solar PV system. ➢ Gross metering solar PV system.		
Method of Assessment	Internal: Assignment & Quiz.		
Learning Outcome E0561133	Assemble standalone solar PV plant. **[Psychomotor & Affective Domain]**	**9 Hrs**	**15 Marks**
Contents	• To assemble standalone solar PV system and measure power flow.		
Method of Assessment	External: Performance of task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	611	Course Name	Renewable Energy Technologies

Course Outcome –4	Identify wind energy as alternative form of energy and its mechanism for producing electrical energy.	Teach Hrs	Marks
Learning Outcome E0561141	Illustrate concepts of wind energy and components used in wind turbine. **[Cognitive Domain]**	8 Hrs	15 Marks
Contents	• Working of wind turbine. • Drag and lift principle. • Conversion of wind energy into electrical energy. • Power content in Wind. • Selection of site for wind power plant. • Efficiency limit for wind energy conversion. • Orientation of wind turbines: Vertical axis and horizontal axis wind turbines. • Components of a horizontal axis wind turbine: Nacelle assembly, rotor assembly, bearings, gearbox, generator, braking system. • Wind power scenario in India.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561142	Explain turbine control and salient features of wind generators. **[Cognitive Domain]**	6 Hrs	10 Marks
Contents	• Type of rotor: Savonius and Darrieus. • Power- speed characteristics. • Torque- speed characteristics. • Wind turbine control: Pitch angle, stall and yaw control. • Salient features of electric generators used in wind power plants: ➢ Squirrel cage induction generators (SCIG). ➢ Wound rotor induction generator (WRIG). ➢ Doubly-Fed induction generator (DFIG). ➢ Synchronous generator. ➢ Permanent magnet synchronous generator (PMSG). ➢ Switch reluctance generator (SRG).		
Method of Assessment	Internal: Mid semester-II theory examination (Pen paper test).		
Learning Outcome E0561143	Identify major components used in wind turbine and measure wind velocity at different time intervals for given location. **[Psychomotor & Affective Domain]**	6 Hrs	10 Marks
Contents	• To prepare a report on components of a wind turbine by visiting/ watching the video clip of the wind power plant. • To measure wind velocity at different time intervals for given location using anemometer.		
Method of Assessment	Internal: Performance of task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	611	Course Name	Renewable Energy Technologies

Course Outcome –5	Identify different renewable energy technologies and need of hybrid energy system.	**Teach Hrs**	**Marks**
Learning Outcome E0561151	Summarize alternative energy sources. **[Cognitive Domain]**	**3 Hrs**	**05 Marks**
Contents	Working principle and applications: • Geothermal energy. • Hydrogen energy. • Biomass energy. Construction/installation, working principle and applications: • Biogas plant.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561152	Relate wind and solar photovoltaic energy system. **[Cognitive Domain]**	**3 Hrs**	**05 Marks**
Contents	Wind -Photovoltaic hybrid energy system: • Advantages and disadvantage of system. • Block diagram representation. • Current status in the context of Indian scenario.		
Method of Assessment	External: End semester theory examination (Pen paper test).		

REFERENCE BOOKS:

S.N.	Title & Publication	Author
1.	Renewable Energy Technologies: A Practical guide for Beginners, PHI Learning, New Delhi.	Chetan Singh Solanki
2.	Renewable Energy Sources and Emerging Technologies, PHI Learning, New Delhi .	D. P. Kothari, K. C. Singal, Rakesh Ranjan
3.	Energy Conservation & Management, Satya Prakashan New Delhi.	Suresh Kumar Soni Manoj Nair
4.	Solar Photovoltaics: Fundamentals, Technologies And Applications, PHI Learning, New Delhi.	Chetan Singh Solanki
5.	Wind Power Plants & Project Development, PHI Learning, New Delhi.	Joshua Earnest Tore Wizelius
6.	Non-conventional Energy Sources, Khanna Publishers.	G. D. Rai
7.	From Sunlight to Electricity: a practical handbook on solar photovoltaic application , TERI, New Delhi .	Suneel Deambi
8.	Wind Electrical Systems installation; Oxford University Press, New Delhi.	S. N. Bhadra, D. Kastha, S. Banerjee
9.	Wind Power: Practical Aspects, TERI, New Delhi .	Shambhu Ratan Awasthi

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/7

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	612	Course Name	Industrial Drives

Course Outcome - 1	Select motors according to drive technology, their characteristics and speed control methods	**Teach Hrs**	**Marks**
Learning Outcome E0561211	Explain fundamentals of electric drive. (Cognitive domain)	**6 Hrs**	**10 Marks**
Contents	• **Electric Drive:** Introduction, Need, Type and Advantages • Need for Accurate Speed Control, Concept of Electric Drive, Trends in Drive Technology, • Classification of Drives, Group Drive, Individual Drive		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561212	Interpret characteristics of motors and speed control methods. (Cognitive domain)	**6 Hrs**	**10 Marks**
Contents	**Motor Characteristics (Torque & Speed) & Speed Control Methods:** • DC Motors: Shunt Motor, Series Motor, Compound Motors, • AC Motors: Induction Motors, Synchronous Motors		
Method of Assessment	Internal: Mid semester theory examination (Pen paper test)		
Learning Outcome E0561213	Perform speed control of a given motor. (Psychomotor domain)	**6 Hrs**	**10 Marks**
Contents	• To perform speed control of DC motors. • To perform speed control of induction motor.		
Method of Assessment	External: Performance of given task and viva voce.		

+

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/7

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	612	Course Name	Industrial Drive

Course Outcome -2	Justify the selection criteria for electrical drive	Teach Hrs	Marks
Learning Outcome E0561221	Classify braking systems of motor. (Cognitive domain)	6 Hrs	10 Marks
Contents	• Requirements of braking system. • Types of mechanical braking. • Types of electrical braking. • Comparison of braking methods in induction motors • Dynamics of braking		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561222	Select suitable motor based on electrical characteristics, applications and type of load. (Cognitive domain)	6 Hrs	10 Marks
Contents	• **Selection of Motors:** Introduction, Electrical Characteristics, Selection of Motor for Different Applications, Motors for Particular Services. • Types of Load: Sign Convention of Torque and Speed. • Quadrantal Diagram of Speed-Torque Characteristics.		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561223	Demonstrate electrical braking. (Psychomotor domain)	5 Hr	10 Marks
Contents	• To demonstrate electrical braking methods		
Method of Assessment	Internal: Performance of given task and viva voce.		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 3/7

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	612	Course Name	Industrial Drive

Course Outcome –3	Use various drives for speed controls of DC motor	Teach Hrs	Marks
Learning Outcome E0561231	Explain various solid state speed controls of single and three phase DC drives. (Cognitive domain)	**6 Hrs**	**10 Marks**

Contents	• Single-phase Controlled Converter Feeding Motor Load
	• Single-phase Drives for Separately Excited DC Shunt Motor:
	  ➢ Full-wave-converter Drives
	  ➢ Dual-converter Drives
	• Three-phase Drives for Separately Excited DC Shunt Motor
	  ➢ Half-wave Converter Drives
	  ➢ Full-wave Converter Drives
	  ➢ Dual-converter Drives
	(**Circuit diagram and working only**)		

Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561232	Describe four quadrant operation of motor and speed control of chopper controlled DC drives. (Cognitive domain)	**6 Hrs**	**10 Marks**

Contents	**Circuit diagram and working of:**
	• Four Quadrant Operation of Separately Excited DC Shunt Motor Fed by Fully-controlled Rectifier
	• Rectifier Control of DC Series Motor
	• Chopper Control of DC motor:
	  ➢ Separately Excited DC Shunt Motor
	  ➢ DC Series Motor
	(**Circuit diagram and working only**)		

Method of Assessment	Internal: Mid semester theory examination (Pen paper test)		
Learning Outcome E0561233	Perform speed control of a given DC motor using drive. (Psychomotor domain)	**7 Hrs**	**10 Marks**
Contents	• To control the speed of DC motor using single phase full/ dual converter drive. • To control the speed of DC motor using three phase full/ dual converter drive. • To control the speed of DC motor using chopper drive. **(Perform at least one or more practical exercises depending upon the availability of resources)**		

Method of Assessment	External: Performance of given task and viva voce.

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/7

Branch	**ELECTRICAL & ELECTRONICS ENGINEERING**	**Semester**	**Sixth**
Course Code	**612**	**Course Name**	**Industrial Drive**

Course Outcome –4	Use various drives for speed control of three phase induction motor	**Teach Hrs**	**Marks**
Learning Outcome E0561241	Illustrate solid state speed control of a 3 phase induction motor by voltage control and frequency control method. (Cognitive domain)	**6 Hrs**	**10 Marks**
Contents	• Basic principle of 3 phase induction motor drive. • Solid state control of 3 phase induction motor: ➢ Stator voltage control by AC voltage controller. ➢ Stator variable frequency control: ▪ voltage source inverter- PWM drives ▪ current source inverter drives ▪ cycloconverter fed IM drive (**Circuit diagram and working only**)		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561242	Explain solid state speed control of a 3 phase induction motor by variable frequency drive and rotor resistance control method. (Cognitive domain)	**6 Hrs**	**10 Marks**
	Solid state control of 3 phase induction motor: • Stator voltage and frequency control - ▪ Basics of V/f drive ▪ scalar control of drives ▪ vector- field oriented control of drives (block diagram only) • Static rotor resistance control ➢ Slip power control – ▪ Static Kramer and ▪ Static Scherbius drive (**Block diagram and working only**)		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561243	Perform solid state speed control of 3 phase induction motor using given method. (Psychomotor domain)	**7 Hrs**	**10 Marks**
Contents	• To perform solid state speed control of 3 phase induction motor using stator voltage control. • To perform speed control of 3 phase induction motor using V/f drive • To perform slip power control of 3 phase induction motor using Static		

	Kramer or Static Scherbius drive **(Perform at least one or more practical exercises depending upon the availability of resources)**
Method of Assessment	Internal: Performance of given task and viva voce.

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/7

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	Sixth

Course Code	612	Course Name	Industrial Drive

Course Outcome –5	Select suitable derive for synchronous motor and advance electrical motor	Teach Hrs	Marks
Learning Outcome E0561251	Explain the working of synchronous motor drives. (Cognitive domain)	6 Hrs	10 Marks
Contents	• Variable frequency control of synchronous motor drive • Vector control of synchronous motor • Self-controlled synchronous motor drive employing load commutated thyristor inverter (**Block diagram and working only**)		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome E0561252	Describe the working of various advance electrical motor drive. (Cognitive domain)	6 Hrs	10 Marks
Contents	• Brushless DC motor drive • Stepper motor drive • Permanent magnet synchronous motor (PMSM) drive • Switched reluctance motor drive (**Block diagram and working only**)		
Method of Assessment	Internal: Assignment and Quiz		
Learning Outcome E0561253	Demonstrate operation of a given motor using drive. (Psychomotor domain)	5 Hrs	10 Marks
Contents	• To perform operation of synchronous motor drive • To perform operation of Brushless DC motor drive/ Stepper motor drive /PMSM drive/ Switched reluctance motor drive **(Perform at least one or more practical exercises depending upon the availability of resources)**		
Method of Assessment	External: Performance of given task and viva voce.		

REFERENCE BOOKS:

S.N.	Title & Publication	Author
1.	Fundamentals of industrial drives, PHI publication, New Delhi	B.N. Sarkar
2.	Fundamentals of electrical drives, Narosa Publication, New Delhi	G. K. Dubey
3.	Power Electronics, Khanna Publishers, New Delhi	P. S. Bimbhra
4.	Power Electronics, Publisher: Tata McGraw-Hill Publishing limited, New Delhi	P. Sen
5.	A first course on Electrical Drives, Wiley Eastern Ltd. New Delhi,	S. K. Pillai
6.	Power Electronics and Drives, Publication: MNPERE, USA	Ned Mohan
7.	Electric motor and Drives, fundamental, types and application, Publication: Elsevier	Austin Huges
8.	Elementary concepts of Power Electronic Drives, CRC Press	K. Sundareswaran
9.	Modern Power Electronics and AC Drives, Prentice Hall	Vimal K. Bose

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 1/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	6

Course Code	E05	Course Name	CONSUMER ELECTRONICS

Course Outcome 1	Discuss the Audio system	Teach Hrs	Marks
Learning Outcome 1	Explain Different types of microphone **(cognitive)**	7	10
Contents	• Characteristic of audio wave, frequency range, pitch, timbre, loudness. • Principle, working, characteristics and application of microphone - Carbon granule microphone. - Condenser microphone. - Ribbon microphone. - Crystal microphone. - Dynamic microphone. - Electret microphone.		
Method of Assessment	External- End semester examination(theory)		
Learning Outcome 2	Describe various types loud speaker **(cognitive)**	7	10
Contents	• Principle & working of speakers - Types of speakers: PMMC - Frequency response of speaker - Audio amplifier - Application of audio amplifiers - Functional Block diagram of PA system • Commercial Sound- stereo, Hi-Fi and Dolby system		
Method of Assessment	External-End semester examination(theory)		
Learning Outcome 3	Analyze characteristics of audio system **(Psychomotor)**	5	15
Contents	• Study public address system and its components. • Study of audio amplifiers stages (pre amplifier, voltage amplifier, power amplifier) • Plotting of directional property of microphones & speakers • Plot frequency response of microphone and speaker		
Method of Assessment	**External**- End semester practical/ viva		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 2/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	6

Course Code	E05	Course Name	CONSUMER ELECTRONICS

Course Outcome 2	Discuss Mobile Handset	Teach Hrs.	Marks
Learning Outcome 4	Describe architecture and features of mobile handset **(cognitive)**	4	10
Contents	• Mobile handset architectures using block diagrams. • comparison between keypad mobile and touchscreen mobile		
Method of Assessment	Internal: Mid semester examination(theory)		
Learning Outcome 5	Define functions of various components of mobile handset **(cognitive)**	10	10
Contents	• Different electronic components used in mobile phones - Transmitter - Charging IC - RAM - ROM - VCO(voltage control oscillator) - Filter(Rx and Tx) - Flash IC - CPU - Crystal oscillator - microphone - Antenna - Audio IC - Speaker - Sensors(proximity, motion, vibration, ambient light) - Displays - Modules (wi-fi, Bluetooth, GPS, camera etc)		
Method of Assessment	**External**- End semester examination(theory)		
Learning Outcome 6	Demonstrate various components of given mobile handset.**(Psychomotor)**	5	**10**
Contents	• Study various components of given mobile handset. • Demonstration of various setting in mobile handset. • Perform hardware test on mobile handset.		
Method of Assessment	Internal: Mid semester practical/ viva		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 3/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	6

Course Code	E05	Course Name	CONSUMER ELECTRONICS

Course Outcome 3	Outline the Video technology	Teach Hrs.	Marks
Learning Outcome 7	Describe working of analog TV. **(cognitive)**	7	10
Contents	• Block diagram of TV communication system • Scanning and its need • Need of synchronizing and blanking pulses • VSB modulation • Composite Video Signal • Concept of Colour Mixing • Colour Triangle • VHF-UHF Channel allocation.		
Method of Assessment	External: End semester examination(theory)		
Learning Outcome 8	Illustrate TV receiver and Display device **(cognitive)**	7	10
Contents	• Block diagram and working of B&W TV receiver and PAL TV receiver. • Features and working of LCD and LED display. • Working principle of DLP, LCD and LED Projector.		
Method of Assessment	External- End semester examination(theory)		
Learning Outcome 9	Discuss Digital TV and Camera **(Psychomotor)**	5	10
Contents	• Features of Smart-TV and HDTV. • Introduction to digital video broadcasting (DVB), • Features and basic function of digital Camera.		
Method of Assessment	Internal: Mid semester practical/ viva		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 4/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	6
Course Code	E05	Course Name	CONSUMER ELECTRONICS

Course Outcome 4	Explain solar energy system, security and safety system.	Teach Hrs.	Marks
Learning Outcome 10	Discuss Solar energy system **(cognitive)**	7	10
Contents	• Introduction to solar energy • Over view of different types of solar modules - Mono-crystalline, - Polycrystalline - Thin- film • Series and parallel connection of modules ,module array • Classification of solar PV plants - Stand-alone solar PV plants - Grid tie solar PV system - Grid connected solar PV system • Concept of blocking diode and bypass diode		
Method of Assessment	External: End semester examination(theory)		
Learning Outcome 11	Illustrate different Security & Safety System **(cognitive)**	7	10
Contents	Functional Block diagram and working of : • Home walkie-talkie • Video door phone • CCTV surveillance system • Electronic combination locks • Integrated fire safety system • Magnetic card and Near field card • RFID		
Method of Assessment	External: End semester examination(theory)		
Learning Outcome 12	Perform experiment on solar energy system and safety system **(Psychomotor)**	5	15
Contents	• Study of security and safety systems • Draw I-V curve of solar module and find out different parameters- short circuit current, open circuit voltage, current at maximum power, voltage at maximum power • Connect a solar power to different dc load.		
Method of Assessment	External: End semester practical/ viva		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5

Branch	ELECTRICAL & ELECTRONICS ENGINEERING	Semester	6

Course Code	E05	Course Name	CONSUMER ELECTRONICS

Course Outcome 5	Outline the Miscellaneous Application of electronics	Teach Hrs.	Marks
Learning Outcome 13	Explain various Domestic & Consumer Appliances **(cognitive)**	7	10
Contents	• Functional Block diagram, specifications and working of Microwave ovens • comparison of microwave oven with convection oven and air fryer • Front penal control of Washing machines, Air-conditioners and Refrigerators		
Method of Assessment	Internal: Mid semester examination(theory)		
Learning Outcome 14	Understand Automobile electronics **(cognitive)**	7	10
Contents	• Need of Electronics in Automobiles. • Electronic control module. • Electronic ignition. • Anti-brake system (ABS). • Electronically controlled suspension. • Instrument panel displays (speedometer, milometer, fuel meter etc.) • Ultrasonic car safety system and parking system. • Theft detection and remote locking.		
Method of Assessment	Internal: Mid semester examination(theory)		

Suggested List of Experiments*:

S.N.	Experiment	CO
1	Setup a public address system.	**1**
2	Study of audio amplifiers stages (pre amplifier, voltage amplifier, power amplifier).s	1
3	To Plot of directional property of microphones & speakers.	1
4	To Plot frequency response of microphone and speaker	1
5	Identify various components of given mobile handset.	2
6	Demonstration of various setting in mobile handset.	2

7	Perform hardware test on mobile handset.	2
8	Explore and list the Features of Smart-TV and HDTV.	3
9	Study digital video broadcasting (DVB),	3
10	Study Features and basic function of digital Camera	3
11	Draw I-V curve of solar module and find out different parameters- short circuit current ,open circuit voltage , current at maximum power ,voltage at maximum power	4
12	Demonstrate the Connection of solar power to different dc load	4

Suggestions for Practical:

Experiments are expected to be performed

1. Using Trainer kits.
2. On virtual lab platforms available online

Reference Books/Web Portals:

S.N.	Title	Author
1.	Consumer Electronics	SP Bali. Pearson Education
2.	Audio and video systems	R G Gupta
3.	Modern television practice	R R Gulati
4.	Television and video engineering	A M Dhake
5.	Automobile Electrical and Electronic Systems	Tom Denton, 3rd edition,
6.	Understanding Automotive electronics	William. B. Ribbens,
7.	Solar photovoltaic technology and systems	Chetan Singh Solanki
8.	Solar Photovoltaic : Fundamentals, Technologies and Application	Chetan Singh Solanki
9.	www.swayam.gov.in	
10.	www.nptel.ac.in	

INTRODUCTION TO PROJECT WORK

Project work is a very important course in all branches of diploma programmes. It offers following opportunities to students of final semester:-

1. To apply the knowledge and skills learnt in previous semesters, to solve real life industrial / engineering / professional problems.
2. To modify/ improve the existing engineering / professional systems
3. To develop systems / components / methods / processes / resources to cater the needs of the nearby small scale / medium industry
4. To develop innovative solutions for prevailing engineering / professional issues / problems / concerns
5. To learn to solve real life engineering / professional problems which often have many aspects to be considered and addressed
6. To learn **skills and abilities** which are otherwise not possible either in classroom or in structured environment of laboratory such as:-
   - **Skill to work in groups or teams,**
   - **Skill to face real life professional problems and to create real life solutions for them,**

- **Skill to take professional decisions under real life constraints and circumstances,**
- **Skill to learn in self directed way to pursue the specific professional projects (Self Directed Learning)**
- **Skill to learn from real life self experiences (lifelong learning)**
- **Skill to manage the real life engineering / professional projects**
- **Skill to plan and organize the self / group professional work**
- **skills to apply the engineering management principles in real life professional projects**
- **Skill to defend / justify self real life engineering / professional work in front of significant others**
- **Skill to complete the professional tasks / work keeping in view societal, legal and environmental considerations**
- **Skill to collect relevant data in real life situations**
- **Skill to relate engineering / professional knowledge gained in various semesters with real life engineering / professional problems**
- **Skill to estimate the duration and costs in real life engineering / professional work**
- **Skill to assess the theoretical feasibility, financial feasibility and time feasibility of real life engineering / professional tasks**

- **Skill to assess the suitability of available human resources for the given engineering / professional task considering their ability, knowledge, experience, interest etc.**
- **Skill to prepare component specifications, engineering drawings / product specifications / work plans for solving real life engineering / professional problems**
- **Skill to conduct market surveys for purchasing of project related components and for hiring specific engineering / professional expert services etc.**

Many of the above skills which are learnt during the project work are also necessary to fulfill the requirements of NBA for attainment of many Programme Outcomes (POs), which are otherwise not possible to be achieved. These POs are:-

- **Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.**
- **Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.**
- **Apply appropriate technology in context of society, sustainability, environment and ethical practices.**

- **Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.**
- **Ability to analyze individual needs and engage in updating in the context of technological changes.**

NBA has put special emphasis on the project work done by students. It has assigned significant marks (35 marks) exclusively for **student's project work** under following heads:-

  - **Method of identification of topics for the project work,**
  - **Methodologies adopted to complete the projects,**
  - **Quality of the projects and report writing,**
  - **Process adopted to assess individual and team performances in the project work,**
  - **Process of monitoring and evaluation of the student's project work,**
  - **Quality of the prototypes made in project work,**
  - **Recognition and awards received by the students' projects in state/ national level etc.**

*Therefore, the aim of introducing the course of **PROJECT WORK** is to ensure learning of above mentioned skills and abilities in the students and also to make efforts to earn the maximum of marks allotted by NBA for assessment of practices followed in the student's project work.*

With an objective to ensure the learning of above skills and abilities as well as to earn maximum marks in NBA assessment, the university has developed the following course structure (COs & LOs) of this course.

The Course on Project Work consists of five phases:-

	Description of phases	COs	LOs	Learn Hrs.	Marks
1	**Literature / industry's need survey and finalization of topic / title**	01	02	20Hrs	25
2	**Detailed planning of the project work**				
3	**Implementing the detailed project plan**	01	02	70Hrs	35
4	**Managing the project activities**				
5	**Reporting of the project work output /outcome / prototype**	01	03	15Hrs	40
	Total	**03**	**07**	**105Hrs**	**100**

The details of COs and LOs are as follows:-

CO1:- The student will be able to prepare a detailed project plan for solving any real life related engineering / technical / professional / industrial problem

LO1:- The student / group will be able to present / justify / defend its project proposal (10 marks)

LO2:- The student group will be able to prepare a detailed activity based plan & activity schedule chart to complete the project (15 marks)

CO2:- The student will be able to implement the project plan and manage the project

LO1:- The student / group will be able to revise / update / re-schedule / re-allocate the activities / resources in the project plan according to their day to day local contingencies (20 marks)

LO2:- The student / group will be able to prepare a daily logbook of project activities performed (15 marks)

CO3:- The student will be able to present the completed project work

LO1:- The student / group will be able to present the prototype / output /outcome of the project work and to defend/ justify methodology implemented as well as the quality of prototype / output / outcome of the project work (15 marks)

LO2:- The student / group will be able to prepare the project report in the prescribed format (15 marks)

LO3:- The student will be able to prepare a reflective learning portfolio about the informal self-learning while working for the project (10 marks)

General Guidelines for Project Work

- The project topics should be related to concerned branch of engineering / profession, but, should not be the exact content of the curriculum taught in the discipline.
- Student's project topics should be preferably 'real life' topics. It means the project topics should have substantial element of uncertainty, complexity and multi-disciplinary-ness which can be coped up by the students. These elements offer opportunities to students to apply engineering/ professional knowledge in real life settings, solve real life problems and to take real life decisions. As a project guide, concerned teacher should ensure these by suitably altering / framing / reframing the statement of topic / title.
- The project topics should be such that students can get opportunity to refer IS codes, Manuals, Handbooks, norms and standards, opportunity to conduct standard tests, and opportunity to operate modern laboratory equipments following SOPs.
- For student's interest, active participation and ownership in the project work, their self-motivation is necessary. Therefore, students should be actively involved in finalizing the topic of project.
- Students should be asked to conduct a brief review of literature for problems and issues in their engineering / professional areas of interest, where they think they can contribute effectively. The project guide should facilitate them in this regard, through his/her expertise and experience.

Every student group should be asked to propose at least three topics of their interest.

- The topics proposed by student project groups should be assessed by the facilitator-teacher on following three criteria:-
    - **The work on the topic should be theoretically and practically feasible**
    - **The project work on the topic should be completed within approx. two and half months**
    - **Availability of required resources should be certain. Cost of project work should also be bearable.**
- Normally, students' project works should be carried out in small groups (3 to 5 students).
- All faculty members of department should be engaged as project guides. Every faculty member should be project guide of at least one student project group.

- Normally, project guides should be assigned to the students through lottery system and students under each faculty should be asked to form their small groups.

Role of a project guide

- The project guide should review the topics of interests of student project groups for enough scope in their project work to inculcate skills and abilities aimed to be developed in students through their project work. Accordingly, he/she should appropriately alter or revise the topics proposed by the student groups. This can also be ensured by reframing, altering or recomposing the statement of the title of the project work and mentioning of specific concepts, specific procedures, specific conditions, specific tests and other specifications in the title of project work.
- The project guide should work as an expert facilitator for students. It means he/she should not be a spoon feeder to the student project group. He/she should facilitate the students through his/her expert knowledge, experience and information, advices, suggestions, clues, hints as and when required by the students' project group.
- As a facilitator, instead of providing readymade solutions to project related problems, he/she should prefer to encourage and facilitate students to face problems, search possible solutions and to choose most appropriate solution. Although, at times of crisis, when he/she observes that students are unable to deal with the complexity of the situation, he/she should also work as savvier.
- Normally, ee/she should not take project related decisions on behalf of students. Rather, he/she should encourage and support students to

take decisions. In exceptional situations, when he/she observes that students are unable to control the project, he /she may take decision or correct decisions taken by them, or direct them so that project could be sailed smoothly.

- The project guide should regularly arrange project progress review meetings with the student groups. He/ she should regularly check their project work logbook. Apart from facilitating them in their project work, he/she should also observe the progress of their variety of project related learning, which is the main objective of the student project work.
- The project guide should appropriately treat the slow learners.

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	1	1	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to prepare a detailed project plan for solving any real life related engineering / technical / professional / industrial problem**
LO Description	**The student / group will be able to present / justify / defend its project proposal**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Preliminary survey of literature/industry for problems for project work, evaluation of the potential project topics, finalizing project topic/title, preparation of project proposal presentation/defending project proposal	Guided learning activity	Project guide will guide student group for literature review, provide industry's problems which can be worked upon as project, guide the groups to evaluate the topics and finalize project topic, guide the group for preparing project proposal, guide group to present / defend their project proposal.	-	08	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group assignment+ student group activity	Every student group will submit project proposal in prescribed format. A departmental seminar will be organized in which different students' groups will present their proposal in front of students of second and third year and faculty members and will justify/ defend their project proposal.	10	Rating Scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. The project topics should be related to concerned branch of engineering / profession, but, should not be the exact content of the curriculum taught in the discipline.

2. For student's interest, active participation and ownership in the project work, their self-motivation is necessary. Therefore, students should be actively involved in finalizing the topic of project.
3. Students should be asked to conduct a brief review of literature for problems and issues in their engineering/ industrial / professional areas of interest, where they think they can contribute effectively. Guide should facilitate them in this regard, through his/her expertise and experience. Every student group should be asked to propose at least three topics of their interest.
4. The topics proposed by student project groups should be assessed by the guide on following three criteria:-
    a. **The project work on the topic should be theoretically and practically feasible**
    b. **The project work on the topic should be completed within approx. three months**
    c. **The required resources should be available to students. Cost associated with the project work should also be bearable.**
5. Project topic / title should be finalized by student groups after due consultation with their project guides.
6. Student's project topics should be preferably 'real life' topics. It means the project topics should have substantial element of uncertainty, complexity and multi-disciplinary-ness which can be handled by the students. These elements offer opportunities to students to apply engineering knowledge in real life settings, in solving real life problems and in taking real life decisions. Project guide should ensure these by suitably altering / framing / reframing the statement of topic / title.
7. The project topics should be preferably such that students can get opportunity to refer, study and apply IS codes, Manuals, Handbooks, norms and standards; get opportunity to conduct standard tests; get opportunity to operate modern laboratory equipments following SOPs.

8. PROJECT PROPOSAL FORMAT:-

1. **Project title:-**
2. **Relevance, need and importance of the project:-**
3. **Project Output / Outcome:-**
4. **Expected time to complete the project:-**
5. **Start date & finish date:-**
6. **Methodology:-**

7. **Major resources required:-**

8. **Estimated cost of project:-**

9. **Potential problems and challenges associated with the project**

10. **Strategy to deal with the potential problems and challenges**

9. Assessment criteria:-

(A) Assessment of project proposal:-

a. Extent of relevance, need of the project and benefits of the project (2 marks)

b. Extent of feasibility of the project work in principle (2 marks)

c. Extent of feasibility of the project work in semester duration (2 marks)

d. Extent of feasibility of project in terms of project cost & availability of resources (2marks)

(B) Assessment of project proposal; quality of presentation / justification/ defense (2 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	1	2	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to prepare a detailed project plan for solving any real life related engineering / technical / professional / industrial problem**
LO Description	**The student group will be able to prepare a detailed activity based plan & activity schedule chart to complete the project**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Need of detailed project plan, creation of activities, logically sequencing of activities, assigning responsibilities of activities, assessing resource requirements of every activity, activity scheduling, activity schedule chart and its application	Guided learning activity	Project guide will guide student group for breaking the project into activities, will guide them to prepare activity specifications, will guide them to arranging activities in logical sequence, will guide them to schedule the activities, will guide them to prepare activity schedule chart	-	12	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group assignment	Every student group will submit its detailed activity based plan and activity schedule chart for their project work. These will be assessed through following criteria	10+ 05	Rating Scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

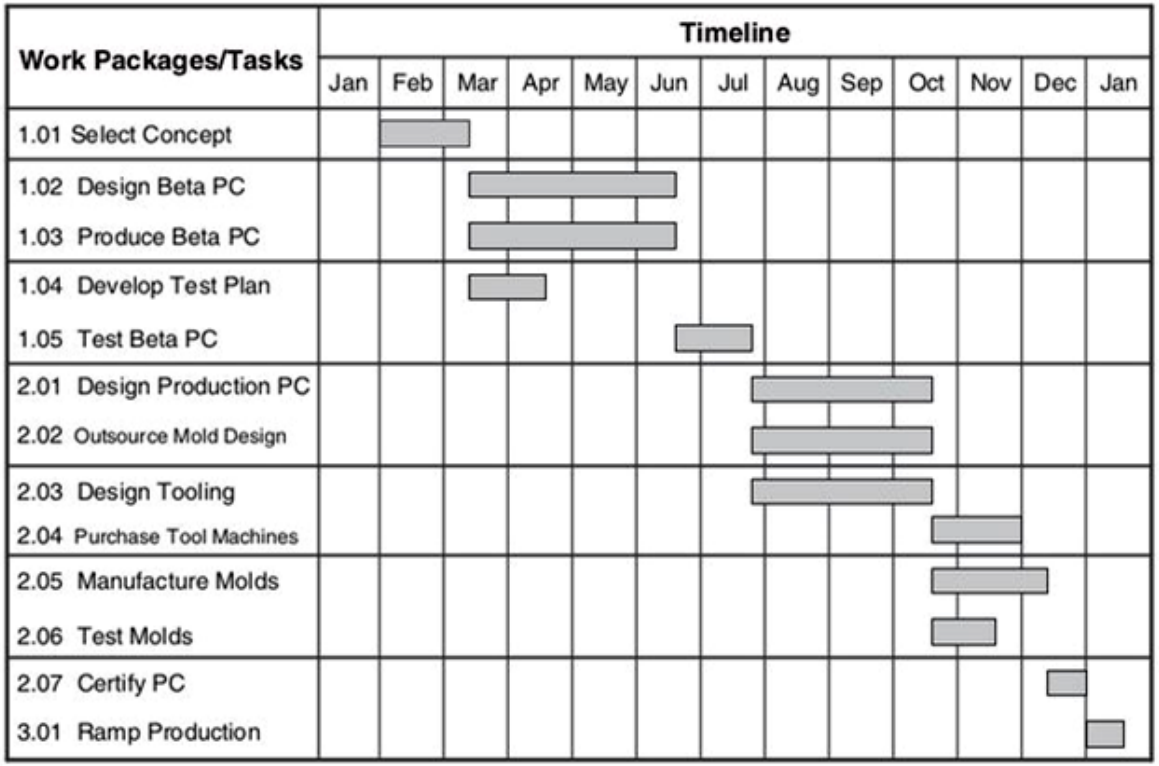
1. **For systematic, efficient and effective project work, project work should be planned before starting working on the project.**
2. **In project planning, project work is broken into different project activities. Activity specifications are prepared. Then, different activities are logically**

sequence, activity numbers are assigned to activities and their start date as well as finish dates are decided.

3. **Activity specifications are the details prepared about the activity. The description of specification elements is as below:-**
    a. **Activity description**
    b. **Activity duration (estimated)**
    c. **Name of group member responsible for the activity**
    d. **Pre-requisite information or prior knowledge required to carry out of the activity**
    e. **List of resources required to complete the activity**
    f. **Estimated expenditure on the activity**
4. **FORMAT FOR DETAILED PROJECT PLAN**

S. No.	Activity No.	Activity description	Activity Duration	Start date	Finish date	Responsible member	Pre-requisite information or knowledge	Resources required	Estimated expenditure

5. **A pictorial presentation of the scheduling of the activities is also prepared. It is also called Gantt chart. It is useful to visualize how the activities will proceed in relation to each other. In the chart, scale on X-axis represents time line which may be hours or days or dates. Y axis represents sequential list of the activities. Activity duration is marked by drawing rectangular horizontal bars of different lengths.**
6. An example of activity schedule chart:-



7. Assessment criteria:-

a. Assessment of submitted detailed project plan (10 marks)

i. Extent of appropriateness of activity descriptions (3 marks)

ii. Extent of appropriateness of activity sequence/ activity durations (3 marks)

iii. Extent of Appropriateness of estimation of required resources / prior information / knowledge (3 marks)

iv. Extent of provisions for contingencies ie delays/ uncertainties /waiting time etc. (1mark)

b. Assessment of submitted activity schedule chart (5marks)

i. Extent of correctness of the chart according to detailed project plan (3marks)

ii. Extent of chart quality in the activity schedule chart (2marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	2	1	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to implement the project plan and manage the project**
LO Description	**The student / group will be able to revise / update / re-schedule / re-allocate the activities / resources in the project plan according to their day to day local contingencies**

SCHEME OF STUDY

S. No	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Implementation of project plan, conducting project activities, Need to update the plan, deviations from plan, reasons for deviations, daily contingencies, assessing, revising/updating/re-scheduling/re-allocation activities / resources, revising the project schedule diagram	Guided learning activity	Project guide will guide student group to implement its project plan, guide them to assess, review, revise, update, reschedule the plan/activities, reallocating resources to different activities , guide the group to revise the project schedule diagram	-	60	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group assignment	Every student group will submit time to time updated / revised project plans and project schedule diagrams along with list of details of revisions made and corresponding reasons/justifications to revise the project plan / project schedule diagrams.	20	Rating Scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. Project plans are prepared by prior estimations about different project activities. Quality of project plan depends on the accuracy of estimation. During real life implementation of project plans, student project groups face contingencies and project does not necessarily proceed exactly

according to plan. There may be contingencies like delays in start / finish of activities, non-availability of resources, delays in availability of resources, availability of better resources etc.

2. Student project group should be able to time to time (weekly) review the plan in the light of circumstances and contingencies, and it should be able to revise the project plan

3. Project guide should guide them in their periodic review of the project plan. Students should prepare the lists of changes to be made in the plan along with reasons or justifications for such changes. According, plan should be revised and in future revised plan should be implemented.

4. **Suggested format for details of revision**:-

S. No.	Date	Revised Plan No.	Description of revisions made	Description of reason / justification
1				
2				
3				
4				

5. Guide should assess extent of improvement done in the plan by the student group considering time to time arising different contingencies.

6. Assessment criteria:-

a. Extent of improvement done related to activities (5 marks)

b. Extent of improvement done related to in charge-ship of activities (5marks)

c. Extent of improvement done related to resource allocations to different activities (5 marks)

d. Extent of improvement done in other misc. ways (5 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	2	2	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to implement the project plan and manage the project work**
LO Description	**The student / group will be able to prepare a daily logbook of project activities performed**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Project log book, its need and importance in project work, contents of the log book, filling in the log book, use of log book in retrieving project related useful information from log book	Guided learning activity	Project Guide will teach the need and benefits of project log book, will guide the students to prepare and regularly fill in the project log book along with project work, will time to time inspect the project logbook and provide feedback to improve the quality of entries	-	10	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group assignment	At the end of their project work, every project group will submit their completed project work log book to the project guide. The project guides will assess the Log book on basis of assessment criteria	15	Rating Scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. A project work Logbook is a record of important events in project management. It is the written record showing all the work from start to finish. It provides evidence of work. It is important to track actions taken, changes made, decisions taken, problems and issues faced while managing a project. All required information is recorded in a logical manner.

2. It is maintained and filled by the project group members.
3. The log book should be filled in at least daily
4. Project work logbook may be maintained either in hard copy or in soft copy.
5. Project guide teacher should guide the students to fill the entries in the log book. He/she should time to time inspect group's project work log book.
6. Following is the suggested format for the log book page:-

PROJECT WORK LOG BOOK		**COLLEGE**				**YEAR**	
DEPARTMENT		**PROJECT GROUP NO.**		**DATE**		**SHEET NO.**	
PROJECT TITLE							
ACTIVITIES FINISHED	*DESCRIPTION*						
PROGRESS IN ONGOING ACTIVITIES	*DESCRIPTION*						
NEW ACTIVITIES STARTED	*DESCRIPTION*						
DELAYS OCCOURED AND REASONS FOR DELAYS	*DESCRIPTION*						
PROBLEMS / ISSUES FACED AND SOLVED	*DESCRIPTION*						
UNSOLVED PROBLEMS	*DESCRIPTION*						
DECISIONS TAKEN	*DESCRIPTION*						
Signature of students	**SIGN-1**				**SIGN-2**		

7. Assessment criteria:-

a. **Extent of regularity of maintaining the log book (5marks)**

b. **Extent of number of entries made in the logbook (5 marks)**

c. **Extent of quality of entries made in the logbook (5 marks)**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	3	1	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to present the completed project work**
LO Description	**The student / group will be able to present the prototype / output /outcome of the project work and to defend/ justify methodology implemented as well as the quality of prototype / output / outcome of the project work**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of project work presentation, preparation for presentation, defending / justifying the presentation, practice and rehearsal	Guided learning activity	Project guides will guide respective student project groups in preparation of power point / physical presentation, project guides will guide the groups to prepare for defending/ justifying the methodology adopted and quality of the project work prototype/ output/ outcome, group practice and rehearsal	-	04	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group presentation	The department will arrange a seminar. All second year and final year students, project guides and external examiner will be present in the seminar, student group will present the prototype/output/outcome of its project work through power point presentation as well as through physical presentation and there will be question answer session after the presentation	15	Rating Scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. Assessment criteria:-

a. Extent of completion of the project work (2 marks)

b. Quality of project prototype/ output/ outcome (5marks)

c. Extent to which the student (group member) appropriately answered the questions of external examiner (8 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	3	2	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to present the completed project work**
LO Description	**The student / group will be able to prepare the project report in the prescribed format**

SCHEME OF STUDY

S. No	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of project report, format for project report, report preparation and editing, proof reading	Guided learning activity	Project guides will guide respective studen project groups in preparation/editing/proof-reading of project work report, the project guides wil assess the final report and will provide feedback for improvements in the report	-	08	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group assignment	The department will submit the project reports of each project group to the external examiner prior to the project presentation seminar. The external examination will study these reports. He/she will assess the worth of the reports on basis of set criteria and will award marks	15	Rating Scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. Project reports communicate information which has been compiled as a result of project work and related issues. Good project reports are documents that are accurate, objective and complete.
2. These should also be well-written, clearly structured and expressed in a way that holds the reader's attention and meets their expectations. The quality

and worth of the project work are also judged by the quality of the written report i.e. its clarity, organization and content.

3. The project report also helps external examiner to have a detailed study of the project work and to frame main questions for oral examination during presentation.
4. The project report should be made in hard copies. But, also soft copies can be made additionally, if necessary.
5. The project report should be made in many copies. One copy for department, one copy for library and one copy for each project group member.
6. **SUGGESTED FORMAT FOR PROJECT REPORT**

    1. Project title
    2. Students' group details
    3. Need & justification
    4. Expected output / outcome of the project
    5. Literature survey
    6. Detailed description of methodology adopted
    7. Description of resources required
    8. Detailed project activity plan
    9. Project activity schedule chart
    10. Modified / updated / rescheduled plan
    11. Modified / updated / rescheduled charts
    12. Major problems faced and their solutions
    13. Major decisions taken
    14. Description of prototype**/** Output/ outcome of the project
    15. Conclusion
    16. Recommendations
    17. Evidences and references

7. Other suggested guidelines for project report

a. Project reports should be typed neatly in New Times Roman letters on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right - 1", Top and Bottom - 0.75".

b. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.

c. Every copy of the report must contain

- Inner title page (White)
- Outer title page with a plastic cover
- Certificate in the format enclosed.

d. Main body of the report should be divided appropriately into sections and subsections. The sections and subsections may be numbered in the decimal form.

e. Section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 12. The figures and tables must be numbered chapter wise.

f. The references should be numbered serially in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3].

8. Suggested format for CANDIDATES' DECLARATION

I/we, ---------- students of Diploma in---------- Department ----------

of ---------- hereby declare that I/we own full responsibility for the information, results and conclusions provided in this project work titled "---------- ---------- "submitted to RGPV (Diploma Wing) for the award of Diploma in -- ----------.To the best of my/our knowledge, this project work has not been submitted in part or full elsewhere in any other institution/organization for the award of any

certificate/diploma/degree. I/we have completely taken care in acknowledging the contribution of others in this academic work. I/we further declare that in case of any violation of intellectual property rights and particulars declared, found at any stage, I, as the candidate will be solely responsible for the same.

Date		Roll Number	Name	Signature
	1			
Place	**2**			
	3			
	4			

7. Suggested format for CERTIFICATE:-

Certified that this project report entitled ---------- ----------"which is being submitted by Mr./Ms. ……., Roll. No……, a bonafide student of ……in partial fulfillment for the award of Diploma in Civil Engineering during the year …….. is record of students' own work carried out under my/our guidance. It is certified that all corrections/suggestions have been incorporated in the Report and one copy of it being deposited in the polytechnic library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said diploma. It is further understood that by this certificate the undersigned do not endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the project only for the purpose for which it is submitted.

Guide Name and signature

External Examiners Name and signature

Head of Department
Dept. of ----------

8. Assessment criteria:-

1. **Quality of content of report (5marks)**
2. **Quality of structure and organization of report (3marks)**
3. **Quality of language used in report (2marks)**
4. **Number and quality of evidences (5 marks)**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
					6	0	4	3	3	4

COURSE NAME	**Project Work**
CO Description	**The student will be able to present the completed project work**
LO Description	**The student will be able to prepare a reflective learning portfolio about the informal self-experiential-learning while working for the project**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of lifelong learning, experiential self-learning, reflections on self-experiences, mechanism of learning from experiences through reflective thinking, reflective learning portfolio and its use in learning from self-experiences	Guided learning activity	Project guides will encourage the students to recall their project related experiences and reflect on those experiences, he /she will provide them reflective learning portfolio format to be filled be each student individually	-	03	Handout, video film*	*Teacher will suggest a suitable online video to be viewed by students

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Individual student assignment	The internal examiner will produce the collected filled reflective learning portfolio formats to the external examiner. External examiner will assess the experiential learning of students through assessing the individual responses to the portfolio questions	10	Rating Scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. Lifelong learning ability, which is a higher order learning ability is now realized as an important skill for professional students so that they can continue their knowledge gradation in future and can create new knowledge from their variety of future professional

experiences.

2. Ability to informally self-learn from self professional experiences is core of lifelong learning ability.
3. Students' project work offers them an opportunity to undergo a variety of professional like experiences. They can learn how to learn from these experiences.
4. We humans do not automatically learn from our experiences. But, when we think and reflect on our experiences, when we question the unexpected results, abnormal happenings, unusual findings, mistakes, errors, delays, disagreements, differences, conflicts etc., we seek reason for them and in this way we learn from them. This process is called reflective learning.
5. In experiential learning, mistakes committed, errors done, wrong decisions, crisis handled and problems faced are considered as learning opportunities rather than the indicators of bad performance. Students should be encouraged to face them, accept them, discuss them, and solve/ correct them.
6. To help students to reflect on their individual project experiences, a tool (questionnaire) called **Reflective Learning Portfolio** is used
7. When student attempts to fill this questionnaire, he/she encounters with few questions which provoke him/her to reflectively think on the project experiences. In this way student learns to reflect on self experiences and creates self-knowledge from self-experiences.
8. Following is the suggested format of Reflective Learning Portfolio (open ended questions with descriptive answers) :-

FORMAT OF PORTFOLIO

1. Student details (Name, Roll Number, Project group no. etc.)
2. Project title
3. Was our plan worked as it was or it has been changed?

   क्या हमारी कार्य योजना सही थी या फिर हमें इसमें आवश्यकतानुसार संशोधन भी करना पड़े?
4. Why the plan needed changes?

यदि हाँ, तो कार्य योजना में संशोधन क्यों करना पड़े? क्या क्या कारण थे?

5. What precautions we should take in future while planning the similar project activities?

   यदि हम भविष्य में इसी तरह के प्रोजेक्ट पर फिर से कार्य करते हैं तो योजना बनाते समय, पहले से ही क्या क्या अतिरिक्त सावधानीयाँ लेंगे?

6. Did I face group related problems? If yes, what major problems I faced?

   क्या प्रोजेक्ट पर कार्य करते समय हमें समूह संबंधी समस्याओं का सामना करना पडा? यदि हाँ, तो प्रनुख समस्याएँ कौन कौन सी थीं?

7. How I solved them?

   हमने उन्हें कैसे-कैसे हल किया?

8. What precautions I should take to avoid such group related problems in similar future project work?

   यदि भविष्य में हमें इसी तरह के प्रोजेक्ट पर फिर से कार्य करना पड़े तो इन समूह संबंधी समस्याओं को टालने के लिए हम पहले से ही क्या क्या सावधानीयाँ बरतेंगे?

9. Did we face problems related to resources? If yes, what were those problems?

   क्या हमें संसाधनों से सम्बन्धित समस्याएँ भी आयीं? यदि हाँ, तो वो कौन कौन सी थीं?

10. How we solved these problems?

    हम इन समस्याओं को कैसे कैसे हल कर पाए?

11. What precautions we will take to avoid such problems in future, if we work in similar project works?

    यदि हमें भविष्य में फिर से इसी तरह के प्रोजेक्ट पर कार्य करना पड़ता है तो हम इन समस्याओं से बचने के लिए पहले से

ही क्या क्या सावधानीयाँ बरतेंगे?

12. What was the worst incident in our project work? How we coped from it? What precautions we will take to avoid such incidences in future, in similar project works

    हमारे प्रोजेक्ट कार्य में सबसे खराब घटना क्या रही? हमने इसका सामना कैसे किया? भविष्य में दोबारा इसी तरह का प्रोजेक्ट करते समय इस तरह की घटना न घटे इसके लिए हम पहले से ही क्या-क्या उपाय करेंगे.

13. Did we face problems like delays, crisis of resources, and expenditure more than what was thought of earlier? What were those problems? How we solved them?

    क्या हमने विलम्ब, संसाधनों का संकट, अनुमान से अधिक खर्च आदि समस्याओं का सामना भी किया? वे समस्याएँ क्या क्या थी? उनसे हम कैसे कैसे निबटे?

14. What precautions we will take to avoid such problems in future, if we work in similar project works

    भविष्य में इसी तरह के प्रोजेक्ट कार्य को करते समय ऐसी समस्याओं से बचने के लिए हम पहले से ही क्या क्या उपाय करेंगे?

15. What advices, tips and suggestion related to project work we would like to give to our junior students?

    अब यह प्रोजेक्ट कार्य करने के उपरांत हम अपने जूनियर छात्रों को प्रोजेक्ट कार्य करने के लिए क्या क्या सुझाव एवं सलाह देना चाहेंगे ताकि उनका प्रोजेक्ट कार्य बगैर विघ्न-बाधा-समस्या के सरलता से पूर्ण हो सके? वर्णन करें.

9. Assessment criteria:-

- **a. Extent and appropriateness problems/ crisis/ delays / mis-happenings etc. described in detail (3marks)**
- **b. Extent and appropriateness coping strategies/ solutions/ handling ways described in detail (3 marks)**

c. **Extent and appropriateness of precautions/ suggestions/ advices/ tips described in detail (4 marks**)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	1	1	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to plan his/ her career**
LO Description	**Student will be able to demonstrate his/her knowledge about career planning**

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of career planning, major career opportunities in concerned branch of engineering / profession, related the career opportunity chart, study of the important career opportunities regarding qualification, knowledge, skills, experience required for them, role of personal factors like personal life style, interest areas, desires, personal preferences in career planning, professional networking	Traditional lecture method	Teacher will explain the terms / concepts mentioned in the content with help of examples and cases, explain various career opportunities in the concerned diploma branch, arrange formative assessment of students to identify weaknesses and provide necessary tutorials	07	03	Any standard book on career planning or handout	teacher will also suggest video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Descriptive type questions will be asked in the test to assess the knowledge of the students	10	Test question paper, Answer sheet , rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Career: - A job or profession that somebody has been trained for and does for a long time; the series of jobs that somebody has in a particular area of work.

Career opportunity:-It is an opportunity related with career.

Career opportunity chart: - It is the chart (a poster) prepared by the faculty/department of concern branch of diploma, which represents various career opportunities and possible career paths in related fields of employment.

Career goals: - A career goal is a well-defined statement explaining the profession that an individual intends to pursue throughout his career. It is important for every job seeker to define their career goals clearly. It helps them to come up with effective action plans. Career goals must be realistic.

Career path: - A career path is a sequence of jobs that leads to your short- and long-term career goals.

Personal factors: - These are student's personal attributes like personality, interest areas, body conditions (handicapped, weight, eye sight etc.) which may affect his/her performance while pursuing the career.

Personal conditions: - These are the student's conditions like economic and social status, family conditions which also affects his/her choice and selection of career. The student should try to integrate their influences in his/her career plan in form of personal preferences.

Career planning: - It refers to the strategy a person uses to determine career goals and the path to achieve those goals.

Process of career planning: - 1. Student's self analysis of strengths, abilities, interest areas, personal preferences etc.

2. Analyzing the available career opportunities in concerned branch of diploma

3. self career goal setting

4. developing and implementing the action plan to achieve these goals

Assessment criteria:-

1. Student's understanding about career and career path (2 marks)
2. Student's knowledge about various career opportunities in branch of his/her diploma (2 marks)
3. Student's knowledge about various possible career paths in branch of his/her diploma (2 marks)
4. Student's understanding of role of personal factors and personal preferences in his/her planning of career (2 marks)
5. Student's knowledge about various steps in planning the career (2 marks)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	1	2	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to plan his/ her career**
LO Description	**Student will be able to plan his/her career on basis of his/her diploma related studies**

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Identification and detailing of important career opportunities in relation to branch of diploma, identification and detailing of important self personal factors and self personal preferences, development of self career plan	Teacher guided student activity	Teacher will guide students in identification and detailing of career opportunities, personal factors and personal preferences, guide them in preparation of their self career plan, arrange formative assessment to identify their weaknesses and conduct tutorials	02	08	Any suitable book on career planning or handout	If necessary teacher may also suggest video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory assignment	Each student will develop his/her self career plan under the guidance of the faculty	15	Student assignment and rating list	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

SUGGESTED FORMAT for STUDENT's SELF - CAREER PLAN

1	Personal Information	Full name	
		Age	
		Gender	
		Existing qualification	
		Pursuing qualification	
2	Description of personal factors	Height	
		weight	
		Eye vision	
		Chronic deceases, illnesses	
		Handicapped-ness	
		My nature	
		My interest areas	
		My values	
3	Description of personal preferences	Description of family condition	
		Description of family economic status	
		Description of family social status	
4	Description of identified career opportunities		
5	Description of my career goals		
6	Description of my career path		
7	Time available for achieving my career goals		
8	Description of important qualifications/ experiences/ knowledge/ skills to be acquired		

9	Details of sources which can facilitate me in acquiring these	
10	Addresses/web addresses/ contact numbers of these sources	
11	Signature of student	

Assessment criteria:-

1. Appropriateness of identified career opportunities (3 marks)
2. Appropriateness of set career goals (3 marks)
3. Appropriateness of selected career path (3 marks)
4. Appropriateness of items described in point no. 8 (3 marks)
5. Appropriateness of details of sources (3 marks)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	2	1	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to present self for employment**
LO Description	**Student will be able to prepare a quality CV, Resume and bio-data along with a covering letter for a job**

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Need of presenting self for employment, salient features and formats of bio-data, CV and resume, comparison of the three for their merits, limitations and specific uses, study of cases and examples of bio-data, CV and resume, creation of effective bio-data, CV, resume and covering letter by all students for self or for the given cases	Traditional lecture + student activity	Teacher will explain features and formats of bio-data, resume and CV, compare them, guide students to prepare self- bio-data, will provide cases and guide them to prepare case based resumes and CVs, arrange formative assessment to identify weaknesses in their learning and will provide tutorials	04	06	Any standard career guidance book or handout	Teacher will also provide video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory assignment	Each student will prepare and submit a bio-data or resume or CV along with a covering letter, either for self or for the given case, as directed by the teacher	10	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Bio-data: - Bio-data gives in simple format, a summary of personal details, educational details, and work experience details of job seeker. The emphasis in a bio data is on personal particulars like date of birth, religion, sex, race, nationality, residence, marital status, and the like. Next comes a chronological listing of education and experience. It is completed in 1-2 pages.

Resume: - Resume is a brief description of personal details, educational qualification, and past work experiences. It is designed to portrait candidate's suitability for a particular job. It does not list out all the education and qualifications, but only highlight specific skills customized to target the job profile. A resume is usually broken into bullets and written in the first person to appear objective and formal. It is completed in 1-2 pages.

Difference between bio-data and resume:-Resume is more focused on the past career of the person in relation to the job for which the candidate is applying. While, bio-data is more focused on the person and his/her academic/ professional achievements. .

Curriculum Vitai (C.V.):- It is a detailed summary of a person's career, qualification and education. A C.V. generally lists out every skills, jobs, degrees, and professional affiliations the applicant has acquired, usually in chronological order. It is completed in 3-4 pages.

Difference between C. V. and resume:--while CV provides comprehensive overview of your general professional profile, resume is focused on candidate's suitability for a specific job he/she interested in. The C.V. lists out every skill, jobs, degrees and professional affiliations the applicant has acquired in chronological order.

Formats of bio-data, resume and C.V.:- Various formats are available on internet. Teacher can adopt any of them which suits to the requirements of the student or the case given to him/her.

Covering letter: - it is a letter in simple format written / typed in first person, attached with the bio-data/resume/C.V. to send the bio-data/resume/C.V. to the job provider.

Assessment criteria:-

1. Appropriateness of the format selected (03marks)
2. Appropriateness of the descriptions provided in the bio-data/resume/CV (07marks)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	2	2	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to present self for employment**
LO Description	**Student will be able to effectively participate in an employment related interview**

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of employment related interviews, purpose of interview, dress code, body language and posture of interviewee, do's and not do's for interviews, interview checklist, practice of facing employment related interviews for all students	Traditional lecture + guided student practice	Teacher / expert will explain the terms / concepts mentioned in the content with help of examples and cases, arrange guided practice, will conduct formative assessment of students to identify their weaknesses and will provide necessary tutorials	04	06	Any standard book on job interview/ handout	Teacher /expert will also suggest video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Teacher -student joint activity	Teacher will arrange a job interview of each student to assess his/her learning for participation in job interview	15	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

1. College administration should hire professional expert who can prepare students for job interviews. Joint training sessions of two or more departments may be planned.

Interview:- It is essentially a structured conversation where one participant asks questions, and the other provides answers

Employment interview: - It is to assess the suitability of candidates for a particular job.

Assessment Criteria:-

1. Extent to which student follows appropriate dress code for interview (2 marks)
2. Extent to which student adopts appropriate body language and posture during the interview (3 marks)
3. Extent to which student follows the do's and not do's during the interview (10 marks)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	3	1	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to plan his / her start-up or small business enterprise**
LO Description	**Student will be able explain his/her knowledge about various institutions and services available to facilitate start-up or small business enterprise**

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Entrepreneurship and its importance, important characteristics of entrepreneurs, process for starting a new business, , incubation period and incubation support services, introduction to important Gov./non-Gov. agencies and their schemes to support startups and small business creations	Traditional lecture	Teacher/expert will explain the terms mentioned in content with help of cases and examples, conduct formative assessment of students' gained knowledge to identified weaknesses in their knowledge and will provide tutorials to them	07	03	Any suitable standard book on entrepreneur-ship and small business establishment or handout	If necessary teacher/expert may also suggest video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Descriptive type questions will be asked in the test to assess the knowledge of the students	10	Test question paper, Answer sheet	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

College administration should hire experts from market to motivate and train students for entrepreneurship, startup and small scale business establishment. Joint sessions for two or more departments may be organized.

Entrepreneurship: - It is the process of establishing a new business on basis of a novel business idea.

Entrepreneur:- A person who creates innovative ideas for business and establishes a new business

Important characteristics of an entrepreneur:-

1. High achievement motivation
2. High passion to achieve self set goals
3. High self discipline
4. Good risk taking ability
5. High ability to think creatively
6. Persistence

Process of starting a business:-

1. Create a great idea for solving a commercial problem which is being faced by a group of customers
2. Make a start-up (business) plan
3. Secure funding for the startup
4. Network with experts like legal advisers, C.A.s, insurance experts and bankers
5. Make sure you are following all legal steps for business setup
6. Establish a location (physical/online)
7. Develop a marketing plan
8. Build a customer base
9. Develop a plan to improve the business

Life stages of an enterprise: - 1. Idea creation, 2. Startup, 3. Expansion and 4. maturity

Business incubation:- It is the support provided to a new startup to protect it, to grow it and to let it expand into a sound business

Incubation support services:- Assistance in building management teams, developing business and marketing plans, funds, professional services, shared equipment, facilities and space etc.

Incubation support agencies:- Department for promotion and internal trade govt. of India, CIIE-IIM Ahmadabad, T-hub at IIT Hyderabad, GOK NASSCOM 10000 STARTUPS WAREHOUSE, GOK INCUBATOR FOR TECH START-UPS(GIFTS), GOK-MOBILE 10X START-UP HUB, BANGALORE BIO INNOVATION etc.

Agencies for supporting entrepreneurship and small business establishment: - CEDMAP, SIDO, NSIC, NI-MSME etc.

Assessment criteria :-

1. Student's understanding about entrepreneurship and characteristics an entrepreneur (3 marks)
2. Student's knowledge about business starting process and four phases of a business (3 marks)
3. Student's knowledge about business incubation support services (2 marks)
4. Student's knowledge about business incubation facilitating agencies (2 marks)

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. 4
					6	0	5	3	2	

COURSE NAME	**PROFESSIONAL DEVELOPMENT-VI**
CO Description	**Student will be able to plan his/her start-up or small business enterprise**
LO Description	**Student will be able to plan his/her startup or small business enterprise**

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Planning self-business, market survey for seeking demand-supply gap, creating business idea for offering new product / service, conceptualizing the business, survey for availability and cost of appropriate technology /machines /raw materials /staff, estimation of various major expenses, financing, preparation of brief startup plan by the students	Traditional Lecture + guided student activity	Teacher /expert will explain the terms mentioned in content, will demonstrate planning through cases and examples, arrange guided practice for preparation of plan by students, arrange formative assessment and tutorials	04	06	Any suitable standard book or handout	If teacher /expert will also suggest video film or other online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory assignment	Each student will prepare his/her startup plan in the format and will submit it to the teacher for its assessment	15	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

College administration should hire experts from market to motivate and train students for planning startup and small scale business establishment. Joint sessions for two or more departments may be organized.

Marketing plan: - The ways in which product or service will be introduced in the target market. It includes sales price, advertizing etc**.**

Operational plan: - The ways in which mass creation of the product or service will be done**.**

Capital required: - Funds required for hiring the land, room, shed, machines, equipments, raw material, consumables etc.

Financial plan: - Ways and means for arrangement of capital.

Format for startup plan

1. Name of student and roll number
2. Brief Description of business idea
3. Brief Description of Field of business and target market
4. Brief Description of identified demand-supply gap or value addition
5. Brief Description or product or service to be provided
6. Brief Description of marketing plan
7. Brief Description of operational plan
8. Brief Description of staff
9. Brief Description of major expenses
10. Brief Description of capital required
11. Brief Description of financial plan

Assessment criteria :-

1. Appropriateness of business idea, demand-supply gap/value addition (5 marks)

2. Appropriateness of product or service and its marketing (5 marks)
3. Appropriateness of staff and operational plan (3 marks)
4. Appropriateness of major expenses, capital required and financial plan (2 marks)