ACADEMIC AFFAIRS OFFICE INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

No. Acd./122/IAPC-95

Dated: December 16, 2020

Head, Department of Water Resources Development & Management

The IAPC in its 95th meeting held on 09.12.2020 and 11.12.2020 vide Item No. 95.2.3 considered and approved the following proposals:

- 1. Introduction of new Institute Elective i.e., IWR-301: Electrical Energy Management (Appendix-A)
- 2. Revision of course contents and renaming of course title of WRN-552 as Project Planning and Management (Appendix-B)

Assistant Registrar (Curriculum)

Encl: as above

Copy to (through e mail):-

- 1. All faculty
- 2. All Heads of Departments/ Centres
- 3. Dean, Academic Affairs
- 4. Associate Dean of Academic Affairs (Curriculum)
- 5. Channel I/ Academic webpage of iitr.ac.in

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE: Water Resources Development and Management

1. Subject Code: IWR-301 Course Title: Electrical Energy Management

2. Contact Hours: L: 3 T: 0 P: 2

3. Examination Duration (Hrs.): Theory: 3 Practical: 0

4. Relative Weightage: CWS: 10-25 PRS: 25 MTE: 15-25 ETE: 30-40 PRE: 0

5. Credits: 4 6. Semester: Autumn 7. Subject Area: OEC

8. Pre-requisite: Nil

9. Objective: To provide basic knowledge on electrical energy management with laboratory experiments.

10. Details of the Course

S.No.	Contents	
		hours
1.	Basics on electrical energy, importance of energy conservation, conventional	10
	and non-conventional energy sources, measuring electrical power and	
	energy, power quality.	
2.	Energy consumption and loss, determining system efficiency, energy	6
	conservation potential in industries, residences and commercial buildings,	
	energy tariff, pay-back period.	
3.	Load management techniques, load factor, audit in electric bill, automatic	8
	demand controller, power factor correction.	
4.	Electrical equipment and energy saving devices, determining efficiency of in-	10
	situ motors, transformers, power electronic converters and variable speed	
	drives, evaluating lamps and fixtures, energy efficient control of centrifugal	
	pumps.	
5.	Case studies- energy conservation on squirrel-cage and wound rotor	8
	induction motors, energy efficient starting of large asynchronous pump	
	turbines, effects of power quality disturbances in electrical equipments.	
Total		

11. List of Experiments:

- (i) Energy saving in electric fan/pump through voltage control
- (ii) Operation of electric motors with ideal and non-ideal supply voltages
- (iii) In-situ efficiency determination of induction motors
- (iv) Energy efficient starting of electric motors
- (v) Performance investigation of electric motors with industrial load diagrams using power quality analyzers
- (vi) Energy conservation in electric motors with loss model controller
- (vii) Energy conservation in electric motors with search controller
- (viii) Power factor correction through fixed capacitors
- (ix) Power Factor correction through thyristor switched capacitors

12. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of
		Publication / Reprint
1.	Dale R. Patrick, Stephen W. Fardo, Ray E. Richardson, Steven	2007
	R. Patrick, "Energy Conservation Guidebook, CRC Press,	
	Second Edition.	
2.	Barnes M., "Practical Variable Speed Drives and Power	2003
	Electronics," Elsevier Publications.	
3.	Chapman, S. J., "Electric Machinery Fundamentals," Tata	2017
	McGraw-Hill 4 th Edition.	
4.	Witte, Larry, Schmidt, Philip, Brown, David, "Industrial	1988
	Energy Management and Utilization," Springer-Verlag Berlin.	

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE: Water Resources Development and Management

1. Subject Code: WRN-552 Course Title: Project Planning and Management

2. Contact Hours: L: 3 T: 1 P: 0

3. Examination Duration (Hrs.): Theory: 3 Practical: 0

4. Relative Weightage: CWS: 20-35 PRS: 0 MTE: 20-30 ETE: 40-50 PRE: 0

5. Credits: 4 6. Semester: Autumn 7. Subject Area: PCC

8. Pre-requisite: Nil

9. Objective: To impart knowledge about Project Planning & Management, CPM, PERT and other operational management techniques for development and management of water resources projects.

10. Details of the Course

S.No.	Contents	Contact hours
1.	Definition of project and project management; Project development cycle;	6
	Project scope and time management; Work break down structure; Project	
	life cycle; Project stakeholders & organizations; Project performance	
	indicators; Characteristics of water resources projects	
2.	Project feasibility, appraisal, and financing; Time value of money; Project cost estimation and cost management	6
3.	Contract Management for works, goods and services; FIDIC contract conditions	3
4.	Risk and uncertainties in project planning, construction and operational	4
	phases; Project risk management; Decision making under risk & uncertainties	
5.	Applications of System Design Techniques in project management – linear	
	programming - transportation & assignment Problems	
6.	Network development for project planning, Critical Path analysis in	9
	scheduling, monitoring and control of construction projects; PERT analysis,	
	Network crashing and time cost trade off; Use of computer software like	
	Microsoft Project	
7.	Waiting line inventory and replacement models; Techniques of resource	4
	allocation, scheduling & management	
8.	Project monitoring systems, Line of Balance in project management control	4
	process, Project management information system.	
Total		

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of
		Publication / Reprint
1.	A guide to the Project Management Body of Knowledge, 6 th	2017
	ed., PMI Publication, North Carolina, USA	
2.	Srinath, L.S., "PERT and CPM, Principles and applications",	2005
	East West Press.	
3.	Punmia, B.C. and Khandelwal, K.K., "Project. Planning and	2004
	Control with PERT and CPM", Laxmi Publications.	
4.	Taha, H.A., "Operations Research- An Introduction", Pearson	2005
	Education.	
5.	Varma, M., "Construction Planning and Management through	1985
	System Techniques", Metropolitan Book Co.	