MECHANICAL ENGINEERING

NUCLEAR ENGINEERING

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01, E02	35	3	All subjects are compulsory
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering & Radiation Shielding	E13	35	3	
4	Health Physics, Reactor Safety and Radiological Safety (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E10	50	4	
6	Engineering Physics	E05	25	2	
	Total		**210**	**17**	

CORE ENGINEERING (MECHANICAL)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Mechanics of Solids (V.Bhasin)	New	40	3	All subjects are compulsory
2	**Code design for PVP (KKVaze)**	**E20 + E27 (Portion related to ASME code Section II)**	**60**	**4**	
3	**Finite Element Method (RKSingh)**	**E27 (Portion related to FEM)**	**30**	**2**	
4	Computational fluid Dynamics and Heat Transfer (DSaha)	E21	50	3	
5	**Fracture Mechanics (JChattopadhyay)**	**E70**	**40**	**3**	
6	Reliability Engineering (HSKushwaha)	E24	**25**	2	
	Total		**245**	**17**	

CORE ELECTIVES (MECHANICAL)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Vibration (ARamaRao)	E26	25	2	Students need to acquire 6 credits in this module
2	Seismic Design (GRReddy)	E65	30	2	
3	Material Science in Nuclear Engineering (GKDey)	E08	20	2	
4	Design of High Temp. Components (KKVaze)	New	40	3	
5	**Computer Aided Design & Manufacturing (BKDutta)**	**New**	**40**	**3**	
6	Nuclear Emergencies (DNSharma)	E69	35	2	
7	Computer Engineering (AGApte)	E64	30	2	
8	Machine Design (DDMathur)	E28	25	2	
	Total		**80 (appr)**	**6**	

SEMINAR

1	Seminar I	General	4
2	Seminar II	Literature Survey	4
3	Seminar III	Research	4
	Total		**12**

M.TECH. THESIS WORK

1	Thesis Work	Dissertation	**32**

Minimum Credits Required For M.Tech. Degree in HBNI

1. **From Course Work: 40**
2. **From Seminars: 12**
3. **From Project Work: 32**

Total: 84 Credits

CHEMICAL ENGINEERING

I NUCLEAR ENGINEERING:

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01, E02	35	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering and Radiation Shielding	E13	40	3	
4	Health Physics, Reactor Safety and Radiological Safety (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E10	50	4	
6	Engineering Physics	E05	20	2	
7	Nuclear Chemical Engineering	E18	35	3	
	Total Hours of Teaching		**245**		

II CORE ENGIEERING (CHEMICAL)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Code Design & FEM Related To Heat Transfer	E20	30	2	
2	Computational Fluid Dynamics and Heat Transfer	E21	50	4	
3	Advanced Chemical Reaction Engineering	E30	25	2	
4	Process Dynamics and Control	E31, E29	45	3	
5	Advanced Mass Transfer	E32	25	2	
6	Process Modeling, Simulation and Optimization	E33 + New	45	3	
	Total Hours of Teaching		**220**		

III CORE ELECTIVES (80 hrs or 6 credicts)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	****Multiphase Flow Systems**	**MFS (New)**	**25**	**2**	
2	Material Science in Nuclear Engineering	E08	20	2	
3	**Chemical Engineering Thermodynamics**	**CET (New)**	40	3	
4	Nuclear Emergencies	E69	35	3	
5	Computer Engineering	E64	30	2	
6	Membrane Technology	New	45	3	
7	+Structural Integrity Assessment	E70	+30	3	
8	**Transport Phenomena**	**TP(New)**	**40**	**3**	
9	Introduction to Artificial Intelligence	E41	15	1	
10	Reliability Engineering	E24	15	1	

IV SEMINARS

S.No	Module	Course No	Hours	Credits	Remarks
	Seminar I			4	
	Seminar II			4	
	Seminar III			4	

V PROJECT

	Project work	**Dissertation**		**32**	

METALLURGICAL ENGINEERING

I NUCLEAR ENGINEERING

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01, E03	35	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering & Radiation Shielding	E13	35	3	
4	Health Physics, Reactor Safety and Radiation Shielding (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E11	40	3	
6	Engineering Physics	E05	20	2	
7	**Nuclear Metallurgy	E19	30	2	
	Total Hours of Teaching		**225**		

II CORE ENGINEERING (MECHANICAL)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Nuclear Materials	E39, E36	50	4	
2	Physical Metallurgy	E34	40	3	
3	Extractive Metallurgy	E35	40	3	
4	**Mechanical Metallurgy	E37	30	2	
5	Corrosion	E38	15	1	
6	Process Control & Instrumentation	E22	20	2	
7	Nuclear Chemical Engineering	E08	35	2	
	Total Hours of Teaching		**230**		

E40,

III CORE ELECTIVES (70 hrs or 6 credits)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Computer Engineering	E64	30	2	
2	*Nuclear Emergencies	E69	*35	2	
3	Structural Integrity assessment	E70	40	3	
4	Image processing and Computer Vision	E55	20	2	
5	Multi scale Material Modeling	New	20	2	
6	Advance Composites	New	35	3	
7	Materials Characterization	New	20	2	

IV SEMINAR

	Seminar I	General		4	
	Seminar II	Literature Survey		4	
	Seminar III	Research		4	

V PROJECT

	Project work	Dissertation		32	

***Nuclear Emergencies** – Same course for CE has **3** Credits

** Nuclear Metallurgy and Mechanical Metallurgy to be swapped for OCES 2007

ELECTRICAL ENGINEERING

I NUCLEAR & ENGG

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01,E04	40	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering and Radiation Shielding	E14	40	3	
4	Health Physics, Reactor Safety & Radiological Safety (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E12	40	3	
6	Materials Science in Nuclear Engineering	E09	20	2	
7	Engineering Physics	E05	20	2	
	Total Hours of Teaching		**205**		

II CORE ENGINEERING (ELECTRICAL)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Principles of Reactor Instrumentation, Kinetics and Control	E15, E16	35	3	
2	Process Instrumentation and Control	E23	20	2	
3	Computer Based Systems Design	E47	45	3	
4	Modern Control Systems Design and Simulation	E46	30	2	
5	Electrical Engineering Practice	E48	30	2	
6	Advanced Electrical Engineering Design	E49	20	2	
7	Reliability Engineering	E25	15	1	
	Total Hours of Teaching		**195**		

III CORE ELECTIVES (100 hrs or 8 credits)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Real Time Systems	E63	15	2	
2	Software Engineering	E42	15	2	
3	Artificial Intelligence and Applications	E41, E79	45	3	
4	Digital Signal Processing and Computer Vision	E44, E55	45	3	
5	Computer Graphics & Visualization	E56	20	2	
6	Computer Hardware	E58	15	1	
7	Unix & Windows Programming	E60	20	2	
8	Computer Engineering	E64	30	2	

IV SEMINAR

	Seminar I	General		4	
	Seminar II	Literature Survey		4	
	Seminar III	Research		4	

V PROJECT

	Project work	Dissertation		32	

ELECTRONICS ENGINEERING

I NUCLEAR ENGINEERING

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01, E04	40	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering and Radiation Shielding	E14	40	3	
4	Health Physics, Reactor Safety & Radiological Safety (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E12	40	3	
6	Materials Science in Nuclear Engineering	E09	20	2	
7	Engineering Physics	E05	25	2	
	Total Hours of Teaching		**210**		

II CORE ENGINEERING (ELECTRONICS)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Principles of Reactor Instrumentation, Kinetics and Control	E15, E16	35	3	
2	Process Instrumentation and Control	E23	20	2	
3	Embedded and Computer Based Systems Design	E54	45	3	
4	Modern Control Systems Design and Simulation	E52	15	1	
5	Advanced Electronics Circuits Design	E53	40	3	
6	Advanced Nuclear Instrumentation	E17	40	3	
7	Reliability Engineering	E25	15	1	
	Total Hours of Teaching		**210**		

III CORE ELECTIVES (80 hrs or 6 credits)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Real-time Systems	E63	15	1	
2	Software Engineering	E42	15	1	
3	Artificial Intelligence and Applications	E41, E79	45	3	
4	Digital Signal Processing and Computer Vision	E45, E55	45	3	
5	Computer Graphics & Visualization	E56	20	2	
6	Unix & Windows Programming	E60	20	2	
7	Micro Electronics and VLSI Design	New	25	2	

IV SEMINAR

	Seminar I	General		4	
	Seminar II	Literature Survey		4	
	Seminar III	Research		4	

V PROJECT

	Project work	Dissertation		32	

COMPUTER SCIENCE

I NUCLEAR ENGINEERING

Sr.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01,E04	40	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering and Radiation Shielding	E14	40	3	
4	Health Physics, Reactor Safety & Radiological Safety (Nuclear Safety Engineering)	E06	20	2	
5	Nuclear Power Plants Engineering	E12	40	3	
6	Materials Science in Nuclear Engineering	E09	20	2	
7	Engineering Physics	E05	20	2	
	Total Hours of Teaching		**205**		

II CORE ENGINEERING (COMPUTER SCIENCE)

Sr.No	Subject Title	Course No	Hours	Credits	Remarks
1	Software Engineering	E43	45	3	
2	Computer Graphics, Image Processing & visualization	E55, E56	40	3	
3	Distributed Computing	E62, E59	45	3	
4	Networking & Communication	E61	45	3	
5	Advanced Operating Systems	E60, E63	45	3	
6	Reliability Engineering	E25	15	1	
	Total Hours of Teaching		**235**	16	

III CORE ELECTIVES (80 hrs or 6 credits)

Sr.No	Subject Title	Course No	Hours	Credits	Remarks
1	Reactor Control Engineering	E15	15	1	
2	Feed Back Control Systems	E57	15	1	
3	Machine Learning & Artificial Intelligence Methods	E41, E79	45	3	
4	Digital Signal Processing	E45	15	1	
5	**Design & Analysis of Algorithms**	***New***	**20**	**2**	
6	**Embedded Systems**	**New**	**20**	**2**	
7	**Knowledge Discovery**	**New**	**20**	**2**	
8	**Database Management Systems**	**New**	**20**	**2**	

IV SEMINAR

	Seminar I	General		4	
	Seminar II	Literature Survey		4	
	Seminar III	Research		4	

V PROJECT

	Project work	Dissertation		32	

INSTRUMENTATION ENGINEERING

I NUCLEAR & ENGG

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Engineering Mathematics	E01, E04	40	3	
2	Nuclear and Reactor Physics	E07	45	3	
3	Reactor Engineering and Radiation Shielding	E14	40	3	
4	Health Physics, Reactor Safety and Radiological Safety (Nuclear Safety Engineering)	E06	40	3	
5	Nuclear Power Plants Engineering	E12	40	3	
6	Materials Science in Nuclear Engineering	E09	20	2	
7	Engineering Physics	E05	20	2	
	Total Hours of Teaching		**205**		

II CORE ENGINEERING (Instrumentation Technology)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Principles of Reactor Instrumentation, Kinetics and Control	E15, E16	35	3	
2	Applied Process Instrumentation	E50	40	3	
3	Computer Based Systems Design	E47	45	3	
4	Modern Control Systems Design and Simulation	E46	30	2	
5	Reactor C&I and Human Machine Interface	E51	40	3	
6	Reliability Engineering	E25	15	1	
	Total Hours of Teaching		**205**		

III CORE ELECTIVES (80 hrs or 6 credits)

S.No	Subject Title	Course No	Hours	Credits	Remarks
1	Real-time Systems	E63	15	1	
2	Software Engineering	E42	15	1	
3	Artificial Intelligence and Applications	E41, E79	45	3	
4	Digital Signal Processing and Computer Vision	E44	45	3	
5	Computer Graphics & Visualization	E56	20	2	
6	Computer Hardware	E58	15	1	
7	Unix & Windows Programming	E60	20	2	

IV SEMINAR

	Seminar I	General		4	
	Seminar II	Literature Survey		4	
	Seminar III	Research		4	

V PROJECT

	Project Work	Dissertation		32	