KARPAGAMACADEMYOF HIGHEREDUCATION

(DeemedtobeUniversity)(EstablishedUnderSection3ofUGCAct,1956)

PollachiMainRoad,EachanariPost,Coimbatore–641 021.INDIA

Architecture2015-2016		
Program		**B.Arch (Architecture)**
S.No.	**Sub.Code**	**Course**
1	14ART401	ContemporaryArchitectureI
2	14ARS423	Climatology
3	13ART501	ContemporaryArchitectureII
4	13ART601	LandscapeArchitecture
5	13ART602	ArchitecturalConservation
6	12ARS722	UrbanDesign&Renewal
7	12ARS723	ArchitecturalConservation
8	12ARE73A	DisasterManagement
9	11ART901	ProfessionalPractice-I
10	11ART902	DisasterManagementandmitigation
11	11ART923	UrbanDesign&Renewal
Program		**M.Arch (Architecture)**
12	15MARESS1	IntroductiontoSustainableArchitecture
13	15MARESS2	SustainableTrendsandTheories
14	15MARESS3	SustainableDesignStrategies
15	15MARESH3	SustainableHousing
16	14MARESS4	SustainableBuilding Systems
17	14MARESH4	CommunityParticipationinHousing
ARTS 2015-2016		
Program		**B.Com Commerce**
S.No.	**Sub.Code**	**Course**
18	15FCA101	FoundationCourse–A(Value Education)
19	15FCB201	FoundationCourse–B(EnvironmentalStudies)
Program		**B.Com ComputerApplications**
20	15FCA101	Foundationcourse-A(Value Education)
21	15FCB201	FoundationCourse-B(EnvironmentalStudies)
Program		**B.ComProfessionalAccounting**
22	15FCA101	FoundationCourse–AValue Education
23	15FCB201	FoundationCourse–BEnvironmentalStudies
Program		**BBA BusinessAdministration**
24	15FCA101	FoundationCourse-AValue Education
25	15FCB201	FoundationCourse-BEnvironmentalStudies
26	14BAU302	OrganizationalBehaviour
27	14BAU403	PersonnelManagementandIndustrialRelations
Program		**BCA ComputerApplications**
28	15FCA101	FoundationCourse-A(Value Education)
29	15FCB201	FoundationCourse-B(EnvironmentalStudies)
Program		**B.Sc ComputerScience**
30	15FCA101	FoundationCourse–A(ValueEducation)
31	15FCB201	FoundationCourse–B(EnvironmentalStudies)
Program		**B.ScInformationTechnology**
32	15FCA101	FoundationCourse–A-Value Education
33	15FCB201	FoundationCourse–B-EnvironmentalStudies
Program		**B.Sc ComputerTechnology**
34	15FCA101	FoundationCourse–A-Value Education
35	15FCB201	FoundationCourse–B-EnvironmentalStudies
Program		**B.Sc Biotechnology**
36	15FCA101	FoundationCourseA-Value Education
37	15FCB201	FoundationCourseB-EnvironmentalStudies
38	13BTU502	EnvironmentalBiotechnology
Program		**B.Sc Biochemistry**
39	15FCA101	FoundationcourseA–Value Education
40	15FCB201	FoundationcourseB-EnvironmentalStudies
Program		**B.Sc Microbiology**
41	15FCA101	FoundationcourseA-Valueeducation
42	15FCB201	FoundationcourseB–Environmentalstudies
43	14MBU402	EnvironmentalMicrobiology
Program		**B.Sc Physics**
44	15FCA101	Foundationcourse-A(Value Education)
45	15FCB201	Foundationcourse–B(EnvironmentalStudies)
Program		**B.Sc Chemistry**
46	15FCA101	Foundationcourse-A(Value Education)
47	15FCB201	FoundationCourse-B(EnvironmentalStudies)
48	14CHU401	GeneralChemistry-IV
49	13CHU601	Chemistry ofNaturalProducts

Program		B.Sc Electronics and Communication Systems
50	15FCA101	FoundationCourseA-Value Education
51	15FCB201	FoundationCourseB-EnvironmentalStudies
Program		**B.Sc Mathematics**
52	15FCA101	Foundationcourse-A(Value Education)
53	15FCB201	Foundationcourse-B(EnvironmentalStudies)
PG		
Program		**M.Sc Microbiology**
54	15MBP105	Environmentalandagriculturalmicrobiology
55	15OEP201	HealthandFitness
Program		**M.Sc Chemistry**
56	15CHP105	GreenandMedicinalChemistry
		M.Com ComputerApplications
57	15CCP204A	OrganizationalBehavoiur
Engineering 2015-2016		
Program		**BE Mechanical Engineering**
S.No	**Sub.Code**	**Courses**
58	15BECC151	HumanValues
59	15BEME204	EnvironmentalStudies
60	14BEME306	EnvironmentalScienceandEngineering
61	12BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BE Electronics and Communication Engineering**
62	15BECC204	EnvironmentalStudies
63	12BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BE Electrical and Electronics Engineering**
64	15BECC151	HumanValues
65	15BECC204	EnvironmentalStudies
66	12BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipdevelopment
67	12BEEE801	EnergyManagementandEnergy Conservation
68	12BEEE802	ElectricalEnergyGeneration,ConservationandUtilization
Program		**BE Civil Engineering**
69.	15BECC151	Humanvalues
70.	15BECC204	EnvironmentalStudies
71.	14BECC406	EnvironmentalScienceandEngineering
72.	13BECE501	EnvironmentalEngineeringI
73.	13BECE511	EnvironmentalEngineeringLaboratory
74.	13BECE601	WaterResourcesEngineering-I
75.	13BECE604	EnvironmentalEngineering-II
76.	12BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
77.	12BECE703	WaterResourcesEngineering-II
78.	12BECEE17	GroundImprovementTechniques
79.	12BEVA751	GeographicalInformationSystemPractice
Program		**BE Computer Science Engineering**
80.	15BECC151	HumanValues
81.	15BECC204	EnvironmentalStudies
82.	12BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BE Automobile Engineering**
83.	15BEAE151	HumanValues
84.	15BECC204	EnvironmentalStudies
Program		**B.Tech Biotechnology**
85.	15BTCC151	HumanValues
86.	15BTCC204	EnvironmentalStudies
87.	14BTBT306	EnvironmentalScienceandEngineering

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Architecture 2016-2017		
Program		**B.Arch(Architecture)**
S.No.	**Sub.Code**	**Course**
1.	16ART101	EnvironmentalScience
2.	15ARS323	ClimateResponsiveArchitecture I
3.	15ART402	ContemporaryArchitecture–I
4.	15ARS423	Climate responsiveArchitecture–II
5.	14ARE63A	EnergyEfficientBuildings
6.	14ARE63B	ArchitecturalConservation
7.	13ARS723	UrbanDesign&Renewal
8.	13ARE73A	DisasterManagement
9.	13ARE73B	EnergyEfficientBuilding
Program		**B.Des(InteriorDesign)**
10.	16IDT201	ContemporaryInteriors
11.	16IDT202	HumanValues
Program		**M.Arch(Architecture)**
12.	16MARES1	IntroductiontoSustainableArchitecture
13.	15MARESS4	SustainableBuildingSystems
14.	15MARESH4	CommunityParticipationinHousing

ARTS2016-2017		
Program		**B.Com Commerce**
S.No.	**Sub.Code**	**Course**
15.	16AEC201	EnvironmentalStudies
16.	15CMU405 A	IndianEconomy
17.	14CMU505 B	PersonnelMangementandIndustrialRelations
Program		**B.Com ComputerApplications**
18.	16AEC201	EnvironmentalStudies
19.	15CCU404A	IndianEconomy
Program		**B.ComProfessionalAccounting**
20.	16AEC201	EnvironmentalStudies
21.	15PAU304A	ManagerialEconomics
Program		**B.ComBusinessProcessServices**
22.	16AEC201	EnvironmentalStudies
Program		**BBA BusinessAdministration**
23.	16AEC201	EnvironmentalStudies
24.	15BAU303	OrganizationalBehaviour
25.	15BAU403	PersonnelManagementandIndustrialRelations
Program		**BCA ComputerApplications**
26.	16AEC101	EnvironmentalStudies
Program		**B.Sc ComputerScience**
27.	16AEC101	EnvironmentalStudies
Program		**B.Sc Information Technology**
28.	16AEC101	EnvironmentalStudies
Program		**B.Sc ComputerTechnology**
29.	16AEC101	EnvironmentalStudies
Program		**B.Sc Biotechnology**
30.	16BTU102	CellBiology
31.	16BTU201	Genetics
32.	16AEC201	EnvironmentalStudies
33.	16BTU211	Genetics-Practical
34.	15BTU401	Genetics
35.	15BTU411	GeneticsandImmunology-Practical
36.	14BTU502	EnviranmentalBiotechnology
37.	14BTU511	rDNA,EnviranmentalBiotechnology,FoodandBioprocessBiotechnologyPractical- V
Program		**B.Sc Biochemistry**
38.	16AEC201	EnvironmentalStudies
Program		**B.Sc Microbiology**
39.	16AEC201	EnvironmentalStudies

Program		B.Sc Physics
40.	16AEC201	Environmentalstudies
Program		**B.Sc Chemistry**
41.	16AEC201	EnvironmentalStudies
42.	15CHU301	GeneralChemistry-III
43.	15CHU401	GeneralChemistry-IV
44.	14CHU505A	GreenChemistry
45.	14CHU601	Chemistryof NaturalProducts
Program		**B.Sc Electronics and Communication Systems**
46.	16AEC101	EnvironmentalStudies
Program		**B.Sc Mathematics**
47.	16AEC201	EnvironmentalStudies
48.	15MMU404B	HumanResourceManagement
PG		
Program		**M. ScBiotechnology**
49.	16BTP103	CellBiologyandMoleculargenetics
50.	16BTP203	EnviromentalBiotechnology
51.	16BTP212	FermentationTechnologyEnvironmentalBiotechnology-Practical-IV
Program		**M.Sc Microbiology**
52.	16MBP204	Environmentalandagriculturalmicrobiology

Engineering2016-2017		
Program		**BEMechanicalEngineering**
S.No.	**Sub.Code**	**Courses**
53.	16BECC151	HumanValues
54.	16BECC204	EnvironmentalSciences
55.	16BEME205A	Basic Electricaland ElectronicsEngineering
56.	13BECC701	ProfessionalEthics,PrinciplesofManagement andEntrepreneurship Development
Program		**BEElectronics andCommunicationEngineering**
57.	16BECC151	HumanValues
58.	16BECC204	EnvironmentalSciences
59.	15BEEC351	Yoga
60.	14BEEC602	EnvironmentalScienceandEngineering
61.	13BECC701	ProfessionalEthicsPrinciplesofManagement andEntrepreneurship Development
Program		**BEElectricalandElectronicsEngineering**
62.	16BECC151	HumanValues
63.	16BECC204	Environmental Sciences
64.	15BEEE305	RenewableEnergySources
65.	15BEEE351	YOGA
66.	13BEEE801	EnergyManagement andEnergyConservation
67.	13BEEE802	ElectricalEnergyGenerationConservationandUtilization
Program		**BE CivilEngineering**
68.	16BECC151	HumanValues
69.	16BECC204	EnvironmentalSciences
70.	15BECE401	WaterResourcesEngineering
71.	15BECE402	SoilMechanics
72.	15BECE406	EnvironmentalEngineering I
73.	14BECE501	EnvironmentalEngineering I
74.	14BECE511	EnvironmentalEngineering Laboratory
75.	14BECE512	SoilMechanicsLaboratory
76.	14BECE601	WaterResourcesEngineering-I
77.	14BECE604	EnvironmentalEngineering-II
78.	14BECC605	EngineeringEconomicsandFinancialManagement
79.	13BECC701	ProfessionalEthics,Principlesof ManagementandEntrepreneurshipDevelopment
80.	13BECE703	WaterResourcesEngineering-11
81.	13BECE7E17	Elective-IGroundWaterEngineering
82.	13BECE711	IrrigationandEnvironmentalEngineering Drawing
Program		**BE ComputerScienceEngineering**
83.	16BECC151	HumanValues
84.	16BECC204	EnvironmentalSciences
85.	15BECS351	Yoga
86.	13BECC701	ProfessionalEthics,Principlesof ManagementandEntrepreneurshipDevelopment
Program		**BE AutomobileEngineering**
87.	16BECC151	Humanvalues
88.	16BECC204	EnvironmentalSciences
89.	13BEAE802	ProfessionalEthics,PrinciplesOf Management&Entrepreneurship
90.	13BEAEE12	Alternatefuelsandenergysystems

Program		B.TechBiotechnology
91.	16BTCC151	HumanValues
92.	16BTCC204	EnvironmentalSciences
93.	13BTBT701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipdevelopment
Program		**B.TechChemicalEngineering**
94.	16BTCC151	HumanValues
95.	16BTCE204	EnvironmentalSciences
Program		**BEBiomedicalEngineering**
96.	16BECC151	HumanValues
97.	16BECC204	EnvironmentalSciences

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Architecture2017-2018		
Program		**B.Arch (Architecture)**
S.No.	**Sub.Code**	**Course**
1.	16ARS323	ClimateResponsiveArchitectureI
2.	16ARS423	ClimateresponsiveArchitecture–II
3.	15ARE631B	DisasterManagment
4.	14ARE73A	DisasterManagement
S.No.	**Program**	**B.Des(InteriorDesign)**
5.	16IDP312	Workshop(Wood,cane&bamboo)
Program		**M.Arch (Architecture)**
6.	17MARS113	DesignResearch&FieldStudies
7.	17MARESS1	IntroductiontoSustainableArchitecture
8.	17MARESS3	SustainableDesignStrategies
9.	17MARESH3	Sustainablehousing
10.	16MARESS4	SustainableBuilding Systems
11.	16MARESH4	CommunityParticipationinHousing
12.	16MARESS5	SustainableTrendsandTheories
Program		**M.Plan(TownandCountryPlanning)**
13.	17MPN102	Socio–EconomicandSpatialaspectsofHumanSettlementsandPlanning
14.	17MPNE2C	GISModelinginUrbanandRegionalPlanning

ARTS 2017-2018		
Program		**B.ComCommerc**
S.No.	**Sub.Code**	**Cours e**
15.	17AEC201	EnvironmentalStudies
Program		**B.ComComputerApplications**
16.	17AEC201	EnvironmentalStudies
17.	15CCU504B	ConsumerBehavior
Program		**B.ComProfessionalAccounting**
18.	17AEC201	EnvironmentalStudies
Program		**B.ComBusinessProcessServices**
19.	17AEC201	EnvironmentalStudies
Program		**BBABusinessAdministration**
20.	17AEC201	EnvironmentalStudies
Program		**BCA ComputerApplications**
21.	17VAE101	EnvironmentalStudies
Program		**B.ScComputerScience**
22.	17AEC101	EnvironmentalStudies
Program		**B.ScComputerTechnology**
23.	17AEC101	EnvironmentalStudies
Program		**B.ScBiotechnology**
24.	17AEC201	EnvironmentalStudies
25.	15BTU504	EnvironmentalBiotechnology
Program		**B.ScMicrobiology**
26.	17AEC201	EnvironmentalStudies
27.	16MBU301	EnvironmentalMicrobiology
28.	16MBU311	EnvironmentalMicrobiology-Practical
29.	16MBU402	MedicalMicrobiology
30.	16MBU412	MedicalMicrobiology-Practical
31.	15MBU504	EnvironmentalMicrobiology
Program		**B.ScPhysics**
32.	17AEC201	EnvironmentalStudies
33.	16PHU314A	RenewableEnergyandEnergyharvesting(Practical)
Program		**B.ScChemistry**
34.	17AEC201	EnvironmentalStudies
35.	16CHU404A	GreenMethodsinChemistry
36.	16CHU414A	GreenMethodsinChemistry-Practical
		B.Sc Electronic sand Communication Systems
37.	17AEC101	EnvironmentalStudies

Program		B.Sc Mathematics
38.	17AEC201	EnvironmentalStudies

PG		
Program		M.ScBiotechnology
39.	17BTP103	CellBiologyand MolecularGenetics
40.	17BTP203	EnvironmentalBiotechnology
41.	17BTP205B	Bio-SafetyandIPR
42.	17BTP212	FermentationTechnology,EnvironmentalBiotechnology-PracticalIV
Program		M.Sc Microbiology
43.	17MBP204	Environmentalandagriculturalmicrobiology
Program		M.Sc Chemistry
44.	17CHP105A	GreenChemistry
45.	17CHP204	Industrialchemicalsandenvironment
46.	17CHP206	WaterManagement
47.	16CHP301	OrganicChemistry-IIINaturalProducts

Engineering 2017-2018		
Program		BEMechanical Engineering
S.No.	Sub.Code	
48.	17BECC151	Yoga
49.	17BECC204	EnvironmentalSciences
50.	14BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
Program		BEElectronicsandCommunication Engineering
51.	17BECC151	Yoga
52.	17BECC204	EnvironmentalSciences
53.	14BEEC802	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
Program		BEElectricalandElectronics Engineering
54.	17BECC151	Yoga
55.	17BECC204	EnvironmentalSciences
56.	15BEEE603	EnergyManagementUtilizationandAuditing
57.	14BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
58.	14BEEE801	EnergyAuditingandManagement
59.	14BEEE802	UtilizationofElectricalEnergy
Program		BECivilEngineering
60.	17BECC151	YOGA
61.	17BECC204	EnvironmentalSciences
62.	15BECE501	EnvironmentalEngineering II
63.	15BECE513	EnvironmentalEngineeringLaboratory
64.	15BECE6E03	Elective-IIGroundImprovementTechniques
65.	14BECE703	WaterResourcesEngineering-11
66.	14BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipDevelopment
67.	14BECE711	IrrigationandEnvironmentalEngineeringDrawing
68.	14BECE751	Value addedcourse-IIGeographicalInformantionSystemPractice
69.	14BECEE34	Elective-IVSeismicStructures
		BEAutomobileEngineering
70.	17BECC151	Yoga
71.	17BECC204	EnvironmentalSciences
72.	14BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipDevelopment
Program		BECSEEngineering
73.	17BECC151	Yoga
74.	17BECC204	EnvironmentalSciences
75.	14BEAEE12	AlternateFuelsandEnergySystems
76.	14BEAE802	ProfessionalEthics,PrinciplesOfManagement&Entrepreneurship
77.	17BTCC204	EnvironmentalSciences
Program		B.TechBiotechnology
78.	17BTCC151	YOGA
79.	17BTCC204	EnvironmentalSciences
	14BTBT701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipdevelopment
Program		B.TechChemicalEngineering
80.	17BTCC151	Yoga
Program		BEBiomedicalEngineering
81.	17BECC151	Yoga
82.	17BECC204	EnvironmentalSciences

Pharmacy2017-2018		
Program		B.Pharm(Pharmacy)
S.No	Sub.Code	Course
83.	17BP206T	Environmentalsciences-Theory
84.	16PYU306	SocialPharmacy andBehaviouralScience
85.	16PYU451	EnvironmentalSciences

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Architecture2018-2019		
Program		**B.Arch (Architecture)**
S.No.	**Sub.Code**	**Course**
1	17ART401	ClimateResponsiveArchitecture
2	16ARES531C	SustainableArchitecture
3	16ARES531D	Acoustics
4	16ARES631A	LandscapeArchitecture
5	16ARES631D	Architecturalconservation
6	16ARES632G	DisasterManagement
Program		**B.Des(InteriorDesign)**
7	18IDP111	Spaceplanning&Ergonomics
8	17IDS323	InteriorLandscape
9	16IDT501	EnvironmentalControlII
Program		**M.Arch (Architecture)**
10	18MARESS1	IntroductiontoSustainableArchitecture
11	18MARESS3	SustainableDesignStrategies
12	18MARESH3	SustainableHousing
13	17MARESS4	SustainableBuildingSystems
14	17MARESH4	CommunityParticipationinHousing
15	17MARESS5	SustainableTrends andTheories
Program		**M.Plan(TownandCountryPlanning)**
16	18MPN102	Socio–Economic andSpatialaspectsofHumanSettlementsandPlanning
17	18MPNE1C	DisasterManagement
18	8MPNE2C	GISModelinginUrbanandRegionalPlanning
19	17MPN301	EnvironmentalPlanning
20	17MPNE3D	WebbasedApplicationstoUrbanandRegional Planning
21	17MPN401	UrbanGovernanceandinstitutionalManagement

ARTS 2018-2019		
Program		**B.Com Commerce**
S.No.	**Sub.Code**	**Course**
22	18AEC201	EnvironmentalStudies
Program		**B.COMComputerApplications**
23	18AEC201	EnvironmentalStudies
		B.Com Professional Accounting
24	18AEC201	EnvironmentalStudies
Program		**B.ComBusinessProcessServices**
25	18AEC201	EnvironmentalStudies
Program		**BBABusinessAdministration**
26	18AEC201	EnvironmentalStudies
27	17BAU402	HumanResourceManagement
Program		**BCAComputerApplications**
28	18AEC101	EnvironmentalStudies
Program		**B.ScComputerScience**
29	18AEC101	EnvironmentalStudies
Program		**B.ScInformationTechnology**
30	18AEI101	EnvironmentalStudies
Program		**B.ScComputerTechnology**
31	18AEC101	EnvironmentalStudies
Program		**B.ScBiotechnology**
32	18AEC201	EnvironmentalStudies
33	17BTU304A	I.P.R.EntrepreneurshipBioethicsandBiosafety
34	17BTU314A	I.P.R.EntrepreneurshipBioethicsandBiosafetyPractical
35	16BTU602B	EnvironmentalBiotechnology
36	16BTU603B	EnivronmentalManagement
37	16BTU612B	EnvironmentalBiotechnologyPractical
38	16BTU613B	EnivronmentalManagementPractical
Program		**B.ScBiochemistry**
39	18AEC201	EnvironmentalStudies
Program		**B.ScMicrobiology**
40	18AEC201	EnvironmentalStudies
41	17MBU301	EnvironmentalMicrobiology
42	17MBU311	EnvironmentalMicrobiology-Practical

Program		B.ScPhysics
43	18AEC201	EnvironmentalStudies
44	17PHU304A	RenewableEnergyandEnergyharvesting
45	17PHU314A	RenewableEnergyandEnergyharvestingPractical
Program		**B.ScChemistry**
46	18AEC201	EnvironmentalStudies
47	17CHU404A	GreenMethodsinChemistry
48	17CHU414A	GreenMethodsinChemistry-Practical
49	16CHU603A	Greenchemistry
50	16CHU613A	Greenchemistry-Practical
Program		**B.ScMathematics**
51	18AEC201	EnvironmentalStudies
PG		
Program		**MBABusinessAdministration**
52	17MBAP302	BusinessEthicsCorporateGovernanceandSocialResponsibility
Program		**M.ScMicrobiology**
53	18MBP204	Environmentalandagriculturalmicrobiology
Program		**M.ScChemistry**
54	18CHP105A	GreenChemistry

Engineering2018-2019		
Program		**BEMechanicalEngineering**
S.No.	**Sub.Code**	**Courses**
55	18BEME205	ConstitutionofIndia
56	16BEME5E06	RenewableEnergySources
57	15BEME701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BEElectronicsandCommunicationEngineering**
58	18BEEC105	Yoga
59	18BEEC204	EnvironmentalSciences
60	15BEEC701	ProfessionalEthics
Program		**BEElectricalandElectronics Engineering**
61	17BEEE305A	RenewableEnergySources
62	15BEEE701	ProfessionalEthics
63	15BEEEOE05	RenewableEnergyResources
Program		**BECivilEngineering**
64	16BECE504	EnvironmentalEngineeringI
65	16BECE5E04	ElectiveIFoundationEngineering
66	16BECE511	AppliedHydraulicsandHydraulicMachineryLaboratory
67	16BECE603A	WaterResourcesEngineering
68	16BECE604	EnvironmentalEngineering II
69	16BECE6E02	ElectiveIIGroundImprovementTechniques
70	16BECE611	IrrigationandEnvironmentalEngineeringDrawing
71	16BECE612	EnvironmentalEngineeringLaboratory
72	15BECE711	IrrigationandEnvironmentalEngineeringDrawing
Program		**BEComputerScienceEngineering**
73	15BECS701	ProfessionalEthics
Program		**BEAutomobileEngineering**
74	18BEAE205	ConstitutionOfIndia
Program		**B.TechBiotechnology**
75	15BTBT7E02	Elective-IVEnvironmentalBiotechnology

Pharmacy2018-2019		
Program		**B.Pharm(Pharmacy)**
S.No	**Sub.Code**	**Course**
76	18BP206T	Environmentalsciences-Theory
77	15PYU705	Social&BehaviouralScience

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Architecture2019-2020		
Program		**B.Arch (Architecture)**
S.No.	**Sub.Code**	**Course**
1	18ART402	ContemporaryArchitecture–I
2	17ART501	ContemporaryArchitecture–II
3	17ARES531	LandscapeArchitecture
4	17ARS623	SustainableArchitecture
5	15ART902	UrbanDesign
6	15ARE932A	EarthQuakeResistanceArchitecture
7	15ARE1031B	GreenBuilding
Program		**B.Des(InteriorDesign)**
10	17IDT501	ContemporaryInteriors
11	14MARESS2	SustainableTrendsandTheories
12	14MARESS3	SustainableDesignStrategies
Program		**M.Arch (Architecture)**
13	19MARESS3	SustainableDesignStrategies
14	19MARESH3	SustainableHousing
15	18MARESS4	SustainableBuildingSystems
16	18MARESS5	SustainableTrends andTheories
Program		**M.Plan(TownandCountryPlanning)**
17	19MPN102	Socio–EconomicandSpatialaspectsofHumanSettlementsandPlanning
18	19MPNE1C	DisasterManagement
19	18MPN301	EnvironmentalPlanning
20	18MPNE3A	EnvironmentalDesign
21	18MPNE3B	EnvironmentalImpactAssesment
22	18MPNE3C	EnvironmentalLegislation,EvaluationandPractices
23	18MPN401	UrbanGovernanceandinstitutionalManagement
ARTS 2019-2020		
Program		**B.ComCommerce**
S.No.	**Sub.Code**	**Courses**
24	19AEC201	EnvironmentalStudies
25	17CMU504B	BusinessEthics
Program		**B.ComComputerApplications**
26	19AEC201	EnvironmentalStudies
Program		**B.ComProfessionalAccounting**
27	19AEC201	EnvironmentalStudies
Program		**B.Com BussinessProcessServices**
28	19AEC201	EnvironmentalStudies
Program		**BBABusinessAdministration**
29	19AEC201	EnvironmentalStudies
Program		**BCAComputerApplications**
30	19AEC201	EnvironmentalStudies
Program		**B.ScComputerScience**
31	19AEC201	EnvironmentalStudies
Program		**B.ScComputerScience(CognitiveSystems)**
32	19AEC201	EnvironmentalStudies
Program		**B.ScInformationTechnology**
33	19AEC201	EnvironmentalStudies
Program		**B.ScComputerTechnology**
34	19AEC201	EnvironmentalStudies
Program		**B.ScBiotechnology**
35	19AEC201	EnvironmentalStudies
36	17BTU601B	BiotechnologyandHumanWelfare
37	18BTU304A	I.P.R.EntrepreneurshipBioethicsandBiosafety
38	18BTU314A	I.P.R.EntrepreneurshipBioethicsandBiosafetyPractical
39	17BTU602B	EnvironmentalBiotechnology
40	17BTU603B	EnivronmentalManagement
41	17BTU611B	BiotechnologyandHumanWelfarePractical
42	17BTU612B	EnvironmentalBiotechnologyPractical
43	17BTU613B	EnivronmentalManagementPractical
Program		**B.ScMicrobiology**
44	19AEC201	EnvironmentalStudies

45	18MBU403	EnvironmentalMicrobiology
46	18MBU413	EnvironmentalMicrobiology-Practical
47	17MBU602A	BiosafetyandIntellectualPropertyRights
48	17MBU612A	BiosafetyandIntellectualPropertyRights-Practical
49	17MBU602B	MicrobesinSustainableAgricultureandDevelopment
50	17MBU612B	MicrobesinSustainableAgricultureandDevelopment-Practical
Program		**B.ScPhysics**
51	19AEC201	Environmental Studies
52	18PHU303A	Renewable Energy and Energy harvesting
53	18PHU313A	Renewable Energy and Energy harvesting Practical
54	18PHU403B	Radiation Safety
55	18PHU413B	Radiation Safety Practical
Program		**B.ScChemistry**
56	19AEC201	Environmental Studies
57	18CHU404A	Green Methods in Chemistry
58	18CHU414A	Green Methods in Chemistry-Practical
Program		**B.ScMathematics**
59	19AEC201	Environmental Studies
		PG
Program		**MBA Business Administration**
60	18MBAPE303B	Social Entrepreneurship
61	18MBAP401	Indian Ethos and Business Ethics
62	18MBAPE401B	Business plan and Ethics
Program		**MScComputerScience**
63	18CSP304	Green Computing
Program		**MSc BioTechnology**
64	19BTP103	Ecology,EvolotionaryandDevelopmentBiology
65	19BTP105C	Bio-EnergyTechnology
66	19BTP205B	AgriculturalBiotechnology
67	18BTP304	EnvironmentalBiotechnology
Program		**MSc Biochemistry**
68	19BCP105B	EcologyandEvolotionaryBiology
Program		**MSc Microbiology**
69	19MBP204	Environmentalandagriculturalmicrobiology
Program		**MSc Physics**
70	18PHP305B	SolarEnergyanditsutilization
Program		**MSc Chemistry**
71	19CHP105A	Green Chemistry

Engineering2019-2020

Program		**BEMechanicalEngineering**
72	13BEME306	EnvironmentalScienceandEngineering
73	11BECC701	Professionalethics,PrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BEElectronicsandCommunication Engineering**
74	13BECC406	EnvironmentalScienceAndEngineering
75	12BECC605	Engineering EconomicsandFinancialManagement
76	11BEEC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipDevelopment
Program		**BEElectricalandElectronicsEngineering**
77	13BECC406	EnvironmentalScienceandEngineering
78	12BECC605	Engineering EconomicsandFinancialManagement
79	11BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipdevelopment
80	11BEEE801	Renewableand NonRenewableEnergySources
81	11BEEE802	EnergyManagementandEnergy Conservation
Program		**BECivilEngineering**
82	13BECC406	EnvironmentalScienceandEngineering
83	12BECE501	EnvironmentalEngineeringI
84	12BECE511	EnvironmentalEngineeringLaboratory
85	12BECE512	SoilMechanicsLaboratory
86	12BECE601	WaterResourcesEngineering-I
87	12BECE604	EnvironmentalEngineering-II
88	12BECE605	DesignofRCStructures-I
89	12BECC606	Engineering EconomicsandFinancialManagement

90	11BECC701	ProfessionalEthics,PrinciplesofManagementandEntrepreneurshipDevelopment
91	11BECE703	WaterResourcesEngineering-11
92	11BECE7E12	MunicipalSolidWasteManagement
93	11BECE711	IrrigationandEnvironmentalEngineeringDrawing
Program		**BEComputerScienceEngineering**
94	13BECC406	EnvironmentalScienceandEngineering
95	12BECC605	Engineering EconomicsandFinancialManagement
96	11BECC701	ProfessionalEthicsPrinciplesofManagementandEntrepreneurship
Program		**BEAutomobileEngineering**
97	13BECC406	EnvironmentalScienceandEngineering
98	11BEAE802	ProfessionalEthicsPrinciplesofManagementandEntrepreneurship
Program		**B.TechBiotechnology**
99	13BTBT306	EnvironmentalScienceandEngineering

KARPAGAM ACADEMY OF HIGHER EDUCATION

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(EstablishedUnderSection3ofUGCAct, 1956)

Pollachi Main Road, Eachanari Post,Coimbatore–641 021.INDIA

VALUE EDUCATION

15FCA101 **FOUNDATION COURSE A (VALUE EDUCATION)** **2H – 1C**

Instruction Hours/week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objectives:

- To improve the integral development of human begins
- To train the students towards sustainable lifestyle
- To create awareness about the values and their significance and role
- To imbibe the concept of discipline and freedom
- To know about goal setting
- To know about responsibility

Course outcomes:

1. **I**mproved the integral development of human begins
2. Trained the students towards sustainable lifestyle
3. Created awareness about the values and their significance and role
4. Imbibed the concept of discipline and freedom
5. Knowledge about goal setting
6. Knowledge about responsibility

UNIT – I

Concept of Self, self-esteem and self-confidence. Concept of personality, determinants and disorgiansation of it. Personality development – meaning.

UNIT – II

Goal setting – meaning and importance; steps in goal setting Manners and Etiquette – meaning need and importance; means to improve. Positive thinking.

UNIT – III

Discipline – meaning. Concept of Roles and Responsibility Time Management – Meaning and steps for effective time management.

UNIT – IV

Interpersonal relationship – meaning and importance; means to improve it. Healthy friendship.

UNIT – V

Family Relationship importance of it; Means to improve. Spirituality – meaning. Its relationship with Altruism, sacrifice, self control, tolerance and truthfulness.

TEXT BOOKS

1. Karpagam Academy of Higher Education, Study Material, 2015.

15CCP204A **ORGANIZATIONAL BEHAVIOUR**

COURSE OBJECTIVES:

To make the students

1. To understand the basic concepts of organizational behavior.
2. To analyze the individual behavior traits required for performing as individual or group.
3. To obtain the knowledge and skills of perceiving, motivating using different learning styles.
4. To understand how to perform in group and team and how to manage the power, politics and conflict.
5. To recognize the importance of organizational culture and organizational change.
6. The course comprise of Organizational behavior, Personality, Attitude, Stress and Organizational Conflict

COURSE OUTCOMES:

Learners should be able to:

1. Analyze behavior issues in the context of the organizational behavior theories and concepts.
2. Assess the behavior of the individuals and groups in organization by applying personality, motivation and learning theories.
3. Manage team and resolve conflict arising between the members.
4. Explain how organizational changes held in the company
5. and culture affect working relationships within organizations.
6. Exhibit the communication skills to convey the thoughts and ideas to the individuals and group.

Unit – I

Organizational Behaviour – Nature – Disciplines contributing to Organizational Behavior – Role of Organizational Behavior – Foundations of Organizational Behavior – Implications of Hawathorne Experiments

Unit – II

Individual Difference – Nature – Causes – Models of Man – Perception – Perceptual Process – Perceptual Selectivity – Distortion in Perception – Personality – Determinants of Personality

Unit – III

Attitude – Concepts – Theories of Attitude Formation – Factors in Attitude Formations – Attitude Change. Stress – Causes of Stress – Effects of Stress – Stress Coping Strategies – Individual and Organizational

Unit – IV

Group Dynamics – Concepts and Features of Group – Types of Groups – Formal and Informal Groups – Causes of Informal Organizations – Types of Industrial Organization – Effects of Informal Organization – Group Cohesiveness

Unit – V

Organizational Conflicts – Functional and Dysfunctional Aspects of Conflicts – Role Conflicts – Interpersonal Conflict – Conflict Management

TEXT BOOK

1. **Aswathappa K** (2012) Organizational Behaviour, Himalaya Publishing House, Mumbai

REFERENCES

1. **Steven MC Shane** (2014), Organizational Behaviour, Tata Mc Graw Hill Publishing, New Delhi
2. **Stephen Robbins** (2013), Organizational Behaviour, Prentice Hall of India learning Pvt. Ltd., New Delhi

15BAU303 ORGANIZATIONAL BEHAVIOUR

COURSE OBJECTIVES

To make the students

- To design the concept of human behavior and provide the students to analyze specific strategic human resources demands for future action.
- To employ the students knowledge with various factors involved in human behaviour
- To apply students to understand about the organizational climate
- To gain an appreciation of the relevance of the study of organizational behaviour to the practice of human resource management
- To enable students to describe how people behave under different conditions and understand why people behave as they do.
- 4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behavior and improve results.

COURSE OUTCOMES

Learners should be able to

1. Understanding the human behavior aspects in achieving the organization goal
2. Construct individual and group behavior in organization**.**
3. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
4. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
5. Analyze the complexities associated with management of the group behavior in the organization.
6. Develop cognizance of the importance of human behavior.

UNIT I

Organizational Behaviour - History - Evaluation - Importance and Scope of Organizational Psychology – Individual Differences – Intelligence Tests – Measurement of Intelligence – Personality - Determinants of Personality - Personality Tests – Nature, Types and uses.

UNIT II

Perception – Perceptual process, Applications in Perception, Factors Affecting Perception – Motivation – Theories - Maslow's Theory – Herzberg – McGregor - X and Y Theory – Financial and Non-financial Motivation – Techniques of Motivation.

UNIT III

Job Satisfaction – Meaning – Factors – Management of Job Satisfaction – Morale – Importance – Employee Attitude and Behaviour - Significance to Employee Productivity -Values and behavior - Factors - Job Enrichment – Job Enlargement.

UNIT IV

Hawthorne Experiment – Importance – Groups Dynamics – Cohesiveness – Co-operation – Competition – Conflict – Types of Conflict – Resolution of Conflict – Sociometry – Groups Norms – Role – Status – Supervision Style – Training for Supervision.

UNIT V

Leadership – Types – Theories – Traits, Managerial Grid - Fiedler's Contingency - Organizational Climate – Organizational Effectiveness – Organizational Development – Counseling and guidance – Importance of counselor – Types of counseling – Merits of counseling.

TEXT BOOKS

1. K.Aswathappa, (2014), Organizational Behaviour., Himalaya Publishing House, Mumbai.

REFERENCES

1. Fred Luthans, (2010), Organizational Behaviour. Tata Mc Graw Hill International, New Delhi.
2. L.M.Prasad, (2011), Organizational Behaviour**,** S.Chand & Co. New Delhi.
3. Stephen P. Robbins, (2013), Organizational Behaviour. Prentice Hall of India Pvt.Ltd. New Delhi.
4. Dr.P.C.Sekar, (2012), Organizational Behaviour. Enpee Publications, Madurai.

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15BAU403 PERSONNEL MANAGEMENT AND INDUSTRIAL RELATIONS

COURSE OBJECTIVES

To make the students

- To understand the functions of personnel management
- To assess knowledge in wage and salary administration
- To introduce the basic concepts, functions and processes of Personnel Management.
- To create an awareness of the role, function and functioning of personnel management in industrial organization.
- To identify the importance of trade union
- To be aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting

COURSE OUTCOMES

Learners should be able to

1. Construct knowledge on primary functional aspect of personnel management
2. Understand the roles and responsibilities of HR professionals
3. Assess Functional aspects of manpower planning, performance appraisal and industrial relations
4. To familiarize students with the basic concepts of organization and management
5. know the structure, functions and various principles of management
6. Elaborate the concept of Industrial Relations. By illustrating the role of trade union in the industrial setup

UNIT I

Personnel Management – Meaning, Nature, Scope and Objectives – Functions of Personnel Department – The role of Personnel Manager – Organization of Personnel Department – Personnel Policies and Procedures.

UNIT II

Manpower Planning – Meaning, Definition ,Nature and Process of Human resource planning - Job Description .– Job Analysis - Purpose and Uses of Job analysis, Steps and Techniques in Job analysis– Job Specification – Recruitment – Sources, Methods or techniques of recruitment and factors affecting recruitment - Selection – Essentials of selection, Steps in selection procedure – Training – Need - importance and methods of training.

UNIT III

Performance Appraisal – Meaning, Definition, Importance and Methods of performance appraisal - Job Evaluation and Merit Rating – Promotion, Transfer and Demotion.

UNIT IV

Wages and Salary Administration – Incentive System – Labour Welfare and Social Security – Safety, Health and Security – Retirement Benefits to Employees – Awareness of PF and ESI

UNIT V

Industrial Relations – Trade Unionism – Grievance Handling – Collective Bargaining - Workers Participation in Management – Overview of Labour Laws.

TEXT BOOKS

1. C.B.Memoria. (2014), Personnel Management and Industrial Relations. Himalaya Publishing House, Mumbai

REFERENCES

1. N.G.Nair, Latha Nair. (2004). Personnel Management and Industrial Relations S.Chand & Company Ltd, New Delhi.
2. N.D.Kapoor. (2015). Elements of Industrial Law. Sultan Chand & Sons, NewDelhi.
3. Tripathy. (2013). Personnel Management and Industrial Relations. Sultan Chand & Sons, New Delhi.

Semester–IV

15MMU404B **ALLIED ELECTIVE-2**

HUMANRESOURCE MANAGEMENT

Course Objectives

This course enables the students to

- Know about the HR principles on anorganization
- Impart the knowledge on wage and salary administration
- Understand the other benefits avail by theemployees.
- Develop, implement, and evaluate employee orientation, training, and development programs.
- Help the students focus on and analyze the issues and strategies required to select and develop manpower resources
- Develop relevant skills necessary for application in HR related issues

Course Outcomes (COs)

On successful completion of this course, the student will be able to:

1. Understand the fundamentals of HR and its interface with other functions in the organization
2. Understand the behavioral aspects at individual as well as organizational level
3. Study the tools & techniques in people management
4. Understand the strategic role of HR and global standards
5. Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes.
6. Administer and contribute to the design and evaluation of the performance management program.

UNIT I

Introduction to HRM: Definition, Objectives and Functions of HRM –Role and Structure of Personnel Functions in Organization, Personal Principles and Policies.

UNIT II

Human Resource Planning: - Characteristics of HRP, Need for Planning HRP Process job Analysis, Job Design, Job Description, Job Specification. Selection Process - Placement and Induction, Training and Development, Promotion, Demotions, Transfers, Separation.

UNIT III

Wage and Salary Administration: - Factors Principles, Compensation Plan, Individuals, Group Incentives, Bonus, Fringe Benefits, and Job Evaluation Systems.

UNIT IV

Employee Maintenance and Integration:- Welfare and Safety, Accident Prevention, Administration

of Discipline, Employee Motivation, Need andMeasures.

UNIT V

Personnel Records and Reports: - Personnel Research and Personnel Audit, Objectives, Scope and Importance.

TEXT BOOK

S.S.Khanka. (2000), Human Resource Management, Sultan Chand & Sons, New Delhi.

REFERENCES

1. CS. Venkataraman and BK.Srivastva:-Personnel Management and HumanResources.
2. Yodder, Dale and Paul.DStandohar – Personnel Management and Industrial Relations.
3. Prasad, Lallan and A.M.Banerjee –Management ofHR

15BECC151 HUMANVALUES

Course Objective

- To enable the students to create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty and to appreciate the rights of others.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.
- To familiarize the student with professional rights and employee rights
- To imparts a good knowledge in weapons development.

Course Outcome

Upon completion of the course, the student should be able to

- Gain knowledge on human values
- Apply ethics in society,
- Discuss the ethical issues related to engineering
- Realize the responsibilities and rights in the society
- Understand about Computer Ethics

UNIT – I : Human life on Earth - Concept of Human Values - Value Education - Aim of education and value education - Types of values - Components of values – Attitudes – types of attitudes

UNIT – II : Self Development : Self analysis – Goal Setting - Thought Analysis – Guarding against Anger - Respect to age, experience, maturity, family members, neighbors, co-workers

UNIT – III : Individual Qualities – Truthfulness – Constructivity – Sacrifice – Sincerity - Self Control – Altruism – Tolerance - Scientific Vision – Regulating Desire

UNIT – IV : Mind Culture - Modern Challenges of Adolescent - Emotions and behavior - Sex and spirituality - Adolescent Emotions - Meditation

UNIT - V : Body and Mind Fitness : (a) Physical Exercises (b) Activities: (i) Moralization of Desires (ii) Neutralization of Anger (iii) Eradication of Worries (iv) Benefits of Blessings

Reference Books

S.No	Author(s) Name	Title of the book	Publisher	Year of Publications
1	Subramanian. R	Professional Ethics	Oxford, New Delhi	2013
2	Govindarajan. M, Natarajan. S, Senthil Kumar. V.S	Engineering Ethics	Prentice Hall of India, New Delhi	2004
3	Tripathi. A.N	Human Values	New Age International	2009
4	Pope. G. U.	Thirukkural with English Translation	Uma Publication, Thanjavur.	2002

15BEME701 PROFESSIONAL ETHICS, PRINCIPLESOFMANAGEMENT AND ENTREPRENEURSHIPDEVELOPMENT

COURSE OBJECTIVE

1. To understand objectives, Strategies, Policies and Plan.
2. To introduce pans by directing and controlling.
3. To Understand the need of Engineering Ethics.
4. To Understand the forces that shape culture.
5. To develop the entrepreneurial skills.
6. To make the students conversant to execute an engineering plan with ethics.

COURSE OUTCOME

1. Prepare objectives, Strategies, Policies and Plan.
2. Execute plans by directing and controlling.
3. Understand the need of Engineering Ethics.
4. Understand the forces that shape culture.
5. Show the entrepreneurial skills.
6. Execute an engineering plan with ethics.

UNITI HISTORICAL DEVELOPMENT,PLANNING, ORGANISING *9*

Definition of Management – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies and Planning Premises– Forecasting – Decision–making – Formal and informal organization – Organization Chart –.

UNITII DIRECTING AND CONTROLLING *9*

Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment –Process of Communication – System and process of Controlling – Requirements for effective control – Control of Overall Performance – Direct and Preventive Control – Reporting

UNITIII ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' – variety of moral issued – types of inquiry – moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of ProfessionalRoles

– theories about right action – Self–interest – customs and religion – uses of ethical theories.

UNITIV FACT*ORS OF CHANGES* *9*

Forces that shape culture, social control – Meaning, Agencies, Institution, Customs, Values, Folkways, Norms and Laws. Social changes – Meaning and nature – Theories.

UNITV ENTREPRENEURSHIP AND MOTIVATION *9*

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth– Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need,Objectives.

TEXT BOOKS

S. No.	Author(s) Name	Title of the book	Publisher	Year of Publication
1	Harold Kooritz and Heinz Weihrich	Essentials of Management	Tata McGraw Hill, New Delhi	2010
2	Khanka S.S	Entrepreneurial Development	S.Chand and Co. Ltd., NewDelhi	2006
3	Mike Martin and Roland Schinzinger	Ethics in Engineering	McGraw–Hill, NewYork	2005

REFERENCES

S. No.	Author(s) Name	Title of the book	Publisher	Year of Publication
1	Tripathy P.C and Reddy P.N	Principles of Management	Tata McGraw Hill, New Delhi	2008
2	Rabindra N Kanungo	Entrepreneurship and innovation	Sage Publications, New Delhi	1998
3	Charles E Harris, and Michael J Rabins	Engineering Ethics – Concepts and Cases	Wadsworth Thompson Learning, New Delhi	2013

WEB REFERENCES

1. http://www.managementstudyguide.com/taylor_fayol.htm
2. http://tutor2u.net/business/gcse/people_motivation_theories.htm
3. http://lfkkb.tripod.com/eng24/gilliganstheory.html
4. http://www.developingeyes.com/five–types–of–entrepreneurs/

18BEAE205 **CONSTITUTION OF INDIA**

Course Objectives:

- To know about the Indian constitution.
- To know about the central and state government functionalities in India.
- To know about Indian society.
- Distinguish different culture among the people.
- Describe the structure and function of state government
- Understand the centre-state relations

Course Outcomes:

Upon successful completion of the course, the students should be able to:

- Explain the functions of the Indian government.
- State and abide by the rules of the Indian constitution.
- Distinguish different culture among the people.
- Describe the structure and function of state government
- Understand the centre-state relations
- Understand the Indian social structure

Course Contents:

UNIT I INTRODUCTION
Historical background – constituent assembly of India – philosophical foundations of the Indian constitution – preamble – fundamental rights – directive principles of state policy – fundamentalduties – citizenship – constitutional remedies for citizens.

UNIT II STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT
Union government – structures of the union government and functions – president – vice president– prime Minister – cabinet – parliament – Supreme Court of India – judicial review.

UNIT III STRUCTURE AND FUNCTION OF STATE GOVERNMENT
State government – structure and functions – governor – chief minister – cabinet – statelegislature – judicial system in states – high courts and other subordinate courts.

UNIT IV CONSTITUTION FUNCTIONS
Indian federal system – centre-state relations – president's rule – constitutional amendments – constitutional functionaries – assessment of working of the parliamentary system in India.

UNIT V INDIAN SOCIETY
Society: Nature, meaning and definition – Indian social structure – caste, religion, language in India – constitutional remedies for citizens – political parties and pressure groups – rights of women,children, scheduled castes, scheduled tribes and other weaker sections.

Suggested Readings:

1. Durga Das Basu, *Introduction to the Constitution of India*, LexisNexis, 2018.
2. Agarwal R C,*Political Theory (Principles of Political Science)*, S. Chand Publishing, 2018.
3. MacIver R M and Page C H, *Society: An Introductory Analysis*, Macmillan India, 1987
4. Sharma K L, *Social Stratification in India: Issues and Themes*, Sage Publications, New Delhi, 1997.
5. Brij Kishore Sharma, *Introduction to the Constitution of India*, Prentice Hall of India, New Delhi, 2005.
6. Gahai U R, *Indian Political System*, New Academic Publishing House, New Delhi, 1998.
7. Sharma, R N, *Indian Social Problems*, Media Promoters and Publishers Pvt. Ltd., New Delhi, 1987.

15PYU705 SOCIAL & BEHAVIOURAL SCIENCE

Course Objectives:

- Social Pharmacy and Behavioral Science course will prepare the young pharmacy student to fit into the social role as Pharmacist. Interaction of pharmacist with doctors- nurses- dentists- physiotherapists and other health workers is to develop team spirit in pharmacist.
- Rational drug use and essential drugs concepts can be realized with meaningful interaction of pharmacists with other health care providers.
- At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.
- This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.
- In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care.
- In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Course Outcomes (CO's):

On successful completion of the course the student will

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical Operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively Manage the team as a team player
4. Manage the time effectively
5. Develop Leadership Qualities and Essentials
6. Know pharmaceutical care services

Course Content:

UNIT I

Social Pharmacy and Behavioral Science-The Concept and context of social pharmacy

UNIT II

Pharmacy Profession-Introduction to profession of Pharmacy-Pattern of entry and employment in pharmacy-Employment position and job responsibilities of a pharmacist-Role of pharmacist in health care-Pharmacy ethics.

UNIT III

Professionalization of community pharmacy- Introduction – professional status of community pharmacy- Patients medication records and pharmacist's extended role-Health screening services in community pharmacy.

UNIT IV

Role of hospital pharmacist in a hospital– Introduction**–** Manufacturing – purchasing- inventory management- distribution andpromoting the rational view of medicine-Definition and concept of clinical pharmacy.

UNIT V

Time Management-Value of Time- How to Track the action items-Goal setting-Using SMART Objective concept– Goals – Tasks- Sub Tasks-Resource Management- Mile Stone- Mapping and Gantt chart application.

TEXT BOOKS

S.No	Author(s) Name	Title of the book	Publisher	Year of Publication
1	Harding Jeoffrey	Social Pharmacy – Innovation & development	Pharmaceutical Press- London	1994

REFERENCES

S.No	Author(s) Name	Title of the book	Publisher	Year of Publication
1	World Health Organization	Use of Essential Drugs	WHO expert committee	1997
2	Darrin Salle	Inspired- Organized & Effective	Darrin Salle	2012
3	Ken Blanchard	The One Minute Manager Meets- The Monkey	Quill	1991

WEBSITES

- **www.publichealth.org**
- **www.web.arizona.org**
- **www.umass.org**

16IDT202 **HUMAN VALUES**

Unit I HUMAN VALUES

Self discipline, Concern for others, Empathy, Kindness, Valuing time, Self Esteem, Dignity, Caring and Sharing, Honesty, Cooperation and Commitment, Responsible citizenship,.

Unit II CHARACTER BUILDING

Self-awareness, Self-confidence, Courage, Team work, Adjustments, Accepting differences, Conflict resolution, Assertiveness, Critical thinking, Decision making, Emotional coping skills.

Unit III DILEMMA OF THE YOUTH

Peer pressure, Mobile Usage, Influence of media, Alcoholism, Smoking & Substance abuse, Road accidents, Suicidal tendency.

Unit IV HEALTH AND WELLNESS

Personal hygiene, Fitness and health: Components and benefits of fitness, Importance of yoga and meditation, Balanced nutritional diet.

Sex education: Infatuation, Healthy life style choices, Sexually Transmitted Diseases, HIV/AIDS awareness.

Unit V PSYCHO – SOCIAL INTERVENTION

Psychotherapy: Supportive therapy, re-educative and re-constructive

References:

1. Standard study material / as prescribed by the concerned course teacher

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ENVIRONMENT

Semester-II

15FCB201 **FOUNDATIONCOURSE-B** **2H–1C**

ENVIRONMENTAL STUDIES

InstructionHours/weekL:2T:0P:0 **Marks:Internal:40 External:60 Total:100**

EndSemesterExam:3Hours

COURSE OBJECTIVES

Tomakethestudents

1. Todemonstrateawareness aboutenvironmentalproblems amongpeople.
2. Todevelopanattitudeofconcernfortheenvironment.
3. Topreparepublictoparticipateinenvironmentprotectionandimprovement.

COURSEOUTCOMES

Learnersshould be able to

1. Demonstrate various renewable and nonrenewable resources of the region, enables environmentallyliteratecitizens (byknowingtheenvironmentalacts, rights,rules,legislation,etc.)
2. Designan appropriatejudgments anddecisionsfortheprotectionandimprovementoftheearth.

Unit-I

Ecosystemand naturalresources:Environment –Definition–components-Ecosystem-Definition, Concept,Scope,importance,structureandfunctionsof ecosystem.Energyflow,Ecologicalsuccession.Food chainsand food webs. Classification ofecosystem. Naturalresources: Forest resources; water resources

Unit-II

Environmentalpollution: Cause, effects and control measures ofAir pollution, water pollution, soil pollution,marinepollution,noisepollution,thermalpollutionandnuclearhazardspollution.Solidwaste management.

Unit– III

Biodiversity and its conservation: Introduction- Definition, genetic, species and ecosystemdiversity, biogeographical classification ofIndia- Value of biodiversity: Consumptive, productive uses; social, ethical, aestheticand optionvalues. Threatstobiodiversity: habitat loss, poaching ofwildlife, man-wildlifeconflicts.

Unit– IV

Socialissues andtheenvironment:Urbanproblems relatedtoenergy-waterconservationandmanagement -Rainwaterharvesting-watershedmanagement.ResettlementandRehabitilisaion.Naturalresourcesand associatedproblems andsustainableutilization.EnvironmentalEducation

Unit–V

Environmentethics:EnvironmentalEthics-Genderequity,ethicalbasisofenvironmenteducationand awareness,conservationethicandtraditionalvaluesystemsofIndia.Valuing nature,cultures,social justice,Humanheritage,equitableuseof resources,preservingresourcesforfuturegeneration,common propertyresources,Ecologyanditsusesanditsdegradation,IntroductiontoEnvironmentalProtectionAct (EPA).

TEXT BOOKS

1. Agarwal,K.M.,P.K.SikdarandS.C.Deb,(2002).ATEXTBOOKSofEnvironment,MacMillan IndiaLtd,Kolkatta, India.
2. Kotwal, P.C. and S. Banerjee, (2002). Biodiversity Conservation– In Managed forest and protectedareas,Agrobios,India.

REFERENCES

1. Singh,M.P.,B.S.SinghandSomaS.Dey,(2004).ConservationofBiodiversityandNatural Resources.Daya PublishingHouse,Delhi.
2. Uberoi,N.K,(2005). EnvironmentalStudies,Excel BooksPublications,NewDelhi,India.
3. Shaw, Rand Krishnamurthy, R.R. (2009). Disastermanagement: globalchallengesand local solutionsUniversities Press (India)PrivateLtd, Hyderabad.
4. SorokinPitirim.A,(1942).ManandSocietyInCalamity.NewYork:Dutton,1942
5. PatrickL.Abbott, (2008). NaturalDisasters,McGrawHill,NewYork.Page:1-7.

13BTU504 ENVIRONMENTAL BIOTECHNOLOGY 5H–5C

Totalhours/week:L:5T:0P:0Marks:Internal:40External:60 Total:100

Scope: This syllabusintegrates appropriateaspectsofpollution,its controlmeasures andvarious treatment strategies andthebiotainvolvedinthosestrategies.

Objective: EnvironmentalBiotechnologyis oneofthemostimportantbranches ofBiotechnologythathas widespreadapplicationsinsustainingacleanenvironment.

UNIT-I

Introduction: Introduction toBiotechnology. Role ofEnvironmental Biotechnology. Market for EnvironmentalBiotechnology.Microbes andmetabolism.Fundamentals ofbiologicalintervention.

UNIT-II

Pollutionandpollutioncontrol: Classifyingpollution-toxicity;persistence;mobility;easeofcontrol; bioaccumulation; chemistry. Pollution controlstrategies – dilution and dispersal, concentration and containment. Practical applications to pollution control – biofilters, biotrickling filters, bioscrubbers. 'Clean'Technology-process changes,biologicalcontrol,bio-substitutions.

UNIT-III

Contaminated landandbioremediation: RemediationMethods -generalised categories, biological, chemical,physical,solidification/vitrification,thermal,Intensive andExtensive technologies.*Insitu* techniques–Biosparging,Bioventing,Injectionrecovery.*Exsitu*techniques-Landfarming,Soilbanking, Soilslurryreactor.Useofbioremediation,Factorsaffectingtheuseofbioremediation.

UNIT-IV

Aerobesandeffluents:Biologicaldecompositionoforganiccarbon,NitrogenandPhosphateremoval. Biological removal,biotransformation,andbiosorption ofmetalions.AerobicandAnaerobicDegradation of Xenobiotics.Bioaugmentationfordegradationof Xenobiotics.Industrialsourcesof wastewater.Treatmentstrategies.

UNIT-V

Phytotechnology andPhotosynthesis: Terrestrial phyto-systems (TPS) - Metal phytoremediation, Organicphytoremediation.Hydrauliccontainment.Aquaticphyto-systems(APS),Macrophytetreatment systems (MaTS),Nutrientfilmtechniques (NFT), Algaltreatmentsystems (ATS).

Texts:

Evans,G.M.andJ.C.Furlong,2003.EnvironmentalBiotechnology:TheoryandApplications.John Wiley&Sons Ltd, WestSussex,England.

Jördening,H.J.andJ.Winter,2005.EnvironmentalBiotechnology.Wiley-VCHVerlagGmbH&Co. KGaA,Weinheim,Germany.

References:

Agarwal,S.K,2002.EnvironmentalBiotechnology.APHPublishingCorporation,NewDelhi,India.

Mara, D, 2003. The Handbookof Water and Wastewater Microbiology. Academic Press, London, England.

B.Sc.Microbiology **2014-2015**

14MBU403 **ENVIRONMENTALMICROBIOLOGY** **(4H–4C)**

InstructionHours/week:L:4T:0P:0 **Marks:**Internal:**40**Extemal:**60**Total:**100**

EndSemesterExam:3Hours

COURSEOBJECTIVES

- ToeducatestudentsaboutEnvironmentalmonitoringandenvironmentalaspectsofmicrobes.
- Toimparta knowledgeonMicrobesandenvironmentandecologicalimportance.

COURSEOUTCOME

Itprovidesacomprehensiveoverviewofbiogeochemicalprocessesrelevanttoenvironmentalscientistsandengineers mediatedbymicroorganisms.

Unit I

Structureandfunctionofecosystems(Definitionandconcept).TypesofEnvironment-Terrestrial,Aquaticandextreme habitats.Environmentalfactorsaffectingmicrobialgrowth.Microbialsuccessionindecomposition ofplantorganicmatter.

Unit II

Microbeinteractions:Mutualism,synergism,commensalism,competition,amensalism,parasitism,predation.Microbe-Plant interaction:Symbioticandnon-symbioticinteractions.Microbe-animalinteraction:Microbesinruminants,nematophagus fungiandsymbiotic luminescentbacteria

Unit III

Carboncycle:Microbialdegradationofcellulose,hemicelluloses,ligninandchitin.Nitrogencycle:Nitrogenfixation, ammonification, nitrification, denitrification andnitratereduction. Phosphorus cycle:Phosphate immobilization and solubilisation.Sulphurcycle:Microbes involvedinsulphurcycle.Otherelementalcycles: Ironandmanganese

Unit IV

SolidWastemanagement:Sourcesandtypesofsolidwaste,Methodsofsolidwastedisposal(compostingandsanitary landfillandincineration).Liquidwastemanagement:Compositionandstrengthofsewage(BODandCOD),Primary, secondary(oxidationponds,tricklingfilter,activatedsludgeprocessandseptictank)andtertiarysewagetreatment.

Unit V

Principlesandbiodegradation ofcommonpesticides,organic(hydrocarbons,oilspills)andinorganic(heavymetals-chelation)matter,biosurfactants.Treatmentandsafetyofdrinking(potable)water,methodstodetectpotabilityofwater samples:(a)MPNtest(b) Membranefiltertechnique.GMOandtheirimpact.

SUGGESTEDREADINGS

1. MaierRM,PepperILandGerbaCP.(2009).EnvironmentalMicrobiology.2nd edition,AcademicPress
2. Okafor,N(2011).EnvironmentalMicrobiologyofAquatic &Wastesystems.1st edition,Springer, NewYork
3. AtlasRMandBarthaR.(2000).MicrobialEcology:Fundamentals&Applications.4th edition.Benjamin/Cummings SciencePublishing, USA
4. SubbaRaoNS.(1999).SoilMicrobiology.4th edition.Oxford&IBHPublishingCo.New Delhi.
5. BartonLL&NorthupDE(2011).MicrobialEcology.1st edition,WileyBlackwell,USACampbellRE.(1983).MicrobialEcology. BlackwellScientificPublication,Oxford,England.
6. CoyneMS.(2001).Soil Microbiology:AnExploratoryApproach.DelmarThomsonLearning.
7. LynchJM&HobbieJE. (1988).MicroorganismsinAction:Concepts&ApplicationinMicrobialEcology.BlackwellScientific Publication,U.K.
8. MartinA.(1977).AnIntroductiontoSoilMicrobiology.2nd edition.JohnWiley&SonsInc.NewYork &London.
9. StolpH.(1988).MicrobialEcology:OrganismsHabitatsActivities.Cambridge UniversityPress,Cambridge,England.
10. MadiganMT, MartinkoJMandParkerJ.(2014).BrockBiology ofMicroorganisms.14th edition.Pearson/BenjaminCummings.

Semester-V

15CHU505A **GREENCHEMISTRY** **5H-5C**

Scope

Greenchemistryisthedesignofchemicalproductsandprocessesthat reduceoreliminatetheuseandgenerationofhazardous substances.Greenchemistryplacesequal importanceonthedevelopmentof sciencewiththeeffectsthedevelopmenthasonthe environmentandtheglobalpopulation.

Objectives

1. Tointroducetheconceptofgreenchemistry
2. Tointroducethe12principlesofgreenchemistryaswellasthe toolsofgreen chemistry.
3. Tofocus ontheapplicationof greenerroutestoimproveindustrialprocessesandtoproduce importantproducts.

Methodology:

Blackboardteaching,GroupdiscussionandPowerpointPresentation.

UNIT-I

Introductiontogreenchemistry

Greenchemistry-relevanceandgoals,Anastas'twelveprinciplesofgreenchemistry-Toolsofgreenchemistry:alternative startingmaterials,reagents,catalysts,solvents andprocesseswithsuitableexamples.

UNIT-II

Microwavemediatedorganicsynthesis(MAOS)

Microwaveactivation–advantageofmicrowaveexposure–specificeffectsofmicrowave–Neatreactions–solidsupports reactions_Functionalgrouptransformations–condensationsreactions–oxidations–reductionsreactions–multi-component reactions.

UNITIII

IonicliquidsandPTC:

Introduction–synthesisofionicliquids–physicalproperties–applicationsinalkylation–hydroformylations–expoxidations –synthesisofethers–Friedel-craftreactions–Diels-Alderreactions–Knoevengalcondensations–Wittigreactions–Phase transfercatalyst- Synthesis–applications.

UNITIV

Supportedcatalystsandbio-catalystsfor Greenchemistry

Introduction–theconceptofatomecomomy–supportedmetalcatalysts–mesoporoussilicas–theuseofBiocatalystsfor greenchemistry-modifiedbiocatalysts–fermentations andbiotransformations–finechemicalsbymicrobialfermentations–vitaminsandaminoacids—Baker'syeast –mediatedtransformations–Bio-catalystmediatedBaeyer-Villigerreactions-–Microbialpolyestersynthesis.

UNITV

Alternativesynthesis,reagentsandreactionconditions

A photochemical alternative to Friedel-crafts reactions -Dimethyl carbonate asa methylating agent – thedesign and applicationsofgreenoxidants –supercriticalcarbondioxideforsyntheticchemistry.

TEXTBOOK:

1.AhluwaliaV.K, 2012. GreenChemistry –Environmentallybenignreactions.IIEdition, AneBooksPvt.Ltd., Chennai.

REFERENCES:

1. Paul T.Anastas&TracyC.Williamson,1996.GreenChemistry–DesigningChemistryfortheEnvironment.II Edition, AmericanChemicalSociety,Wahington,D. C.
2. Paul T.Anastas&TracyC.Williamson,1998.GreenChemistry–Frontiersinbenignchemicalsynthesisand processes.OxfordUniversityPress, UnitedKingdom.
3. Rshmi Sanghi &M. M. Srivastava,2003.GreenChemistry–Environmentfriendlyalternatives.NaroraPublishing House,Chennai.

Semester-VI

15CHU601 CHEMISTRYOF NATURAL PRODUCTS 5H-5C

Scope

Natural productChemistryinvolvestheclassificationofnatural products,isolationtechniquesstructure elucidationandsynthsisof terpenes,steroids,alkaloidsandrelatedcompounds.Thecoursealsoinvolves chemotherapy.Thecourseallowsonetogetafundamentalideaabout theNatural products.Thecourse helps thestudentsinimprovingtheirdiverseskillsinvarious areassuchaslaboratoryskills,numericaland computingskills,ability toapproach to theproblemsbothanalytically andlogically,timemanagement skills,etc. Theprinciplesinthis course areusedinmanyindustriesinparticulardrugandfoodindustries.

Objectives

1. Tounderstandthefieldofnaturalproductschemistry;
2. Toidentifynaturalproductsandtheirprobablesyntheticpathways.
3. Toenhancetheirunderstanding ofbiologicalandbiochemicalsciences.
4. TolearnabouttheNaturalproductsincluding terpenoids,alkaloids,vitamins, hormones andchemotherapeuticagents

Methodology:
Blackboardteaching,DiscussionandPowerPointPresentations

UNIT-I
Terpenoids:Introduction–Classification–Generalmethodsofisolation–Isoprenerule-Structuralelucidationandsynthesis ofgeraniol, terpinol,dipenteneandalpha-pinene.

UNIT-II
Alkaloids– Introduction–Classification– Generalcharacteristics – Generalmethodsofdetermining structures–Hofmann'sexhaustivemethylation,structuralelucidationandsynthesisofNicotine,Conine, PiperineandPapaverine.

UNIT-III
Vitamin's–Introduction–Importanceofvitamins– structuralelucidationandsynthesisofRetinol,Thiamine,Riboflavin, Ascorbicacids.

UNIT-IV
Hormones: Introduction– Structuralelucidationandsynthesisofadrenaline andthyroxin.
Steroids:Introduction-Chemistryandstructureofcholesterol.Synthesis(not necessary),Enzymes.

UNIT-V
Chemotherapy:Introduction–Classificationofdrugs–lethaldose–chemistryandapplicationofsulphadrugs,Antimalarials, and Amoebicidal drugs, Antiseptics, Antipyretics, Analgesics and Antibiotics, Penicillin, Streptomycin, Chloromycetin, Tetracycline-Structure andusesonly.

TEXT BOOK:
1.Agarwal,.O.P,2003.NaturalProductChemistry,GoelPublishingHouse,Meerut.

REFERENCES:

1. ArunBahl and B.S.Bahl,2005.AdvancedOrganicChemistry,S.ChandAndCompany, NewDelhi
2. Finar,I.L.,2003.OrganicChemistry,Vol.I&Vol.II, PearsonEducation,Singapore.
3. GurdeepR.Chatwal,2001.OrganicChemistryOf NaturalProducts,Vol.I,HimalayaPublishingHouse,NewDelhi.
4. GurdeepR.Chatwal,2004.OrganicChemistryOf NaturalProducts,Vol.II, HimalayaPublishingHouse,NewDelhi.
5. Madan.R.L,2005.OrganicChemistryQ&A,S.ChandAndCompany,NewDelhi.

Semester-I

15CHP105 GREENANDMEDICINAL CHEMISTRY 4H 4C

InstructionHours/week:L:4T:0P:0Marks:Internal:40External:60Total:100

Scope

Greenchemistryisthedesignofchemicalproductsandprocessesthatreduceoreliminatetheuseand generationofhazardoussubstances."Greenchemistryplacesequalimportanceonthedevelopmentof science with the effects the development has onthe environment and the globalpopulation. Green chemistry breaksawayfrom thetraditionalmethodsthatsolely consideredthetreatmentorabatementof pollutionafteritwas created,andconsiders alternative routesobviatingtheneedtoproducethewaste.

ThecoursealsodealswiththeBasicsofMedicinalchemistry,Drugtargets,Pharmacokineticsanddrug metabolism,Clinicaltraininginthemedicinalchemistryarea.

Objectives

1.Tointroducetheconceptof Greenchemistry.
2.Tounderstandthebasics ofMedicinalchemistry.
3.Tointroducethe12principles ofGreenchemistryas wellas thetools ofGreen chemistry.
4.Todemonstratehowtoevaluatea reactionorprocess anddetermine"Greener" alternatives.
5.Tofocus ontheapplicationofgreenerroutestoimproveindustrialprocesses andto produceimportantproducts.
6.Tounderstandthedrugtargets,drugmetabolismandaboutclinicaltraining.

Methodology

Blackboardteaching,Powerpointpresentationandgroupdiscussion.

UNIT–I

Introductiontogreenchemicalprinciples: Definition,twelveprinciplesofgreenchemistry,solventless reactions-reactionsinwater,microwavesandfluoroussolvents-Atomefficientprocesses:evaluating chemicalreactionsaccordingtotheiryieldandatomefficiency-examplesofenzymaticreactionsand catalyticprocesses-Planningofgreen synthesisinachemicallab.

UNIT–II

Greenerreagentsandreactions: Methodsofdesigningsaferchemicals.Examplesofgreenerreagents includingreplacementofphosgeneandsolidstatepolymerizations.

Greenreactions: Acyloincondensation,Aldolcondensation,ArndtEistertsynthesis,BakerVenkatraman synthesis,Beckmannrearrangement,ClemmensonreductionandBaeyer Villigeroxidation.

UNIT-III

BasicsofMedicinalchemistry: Classificationofdrugs-basicsofmolecularmodelinganddocking-prodrugsandsoftdrugs-types ofprodrugs system.
Drugtargetsanddrugsolubility: Enzymesandenzymeinhibitor–competitiveandnon-competitive inhibitors–reversibleandirreversibleinhibitors–ligandreceptortheories:-Clarke'stheoryandPaton's ratetheory–effectofpH,pKaandpolarityondrugsolubility

UNIT–IV

Pharmacokineticsanddrugmetabolismanddevelopmentofnewdrugs: Absorption,distribution,metabolism ,elimination–oxidationandhydrolysis ofadrug- Designofanewdrug–proceduresindrug design-accidentaldiscovery-molecularmodificationofleadcompounds.

UNIT–V

Clinicaltrainingandsynthesisofdrugs: Variousphasesinpre-clinical testingandclinical testing–designingorganic synthesis–differenttypesof synthesis–complexesandchelatingagents–natural resourcesofleadcompounds–extractionandisolationofbioactivecompounds.

TEXT BOOKS:

1. AhluwaliaV.K.,2012.GreenChemistry-EnvironmentallyBenignReactions.AneBooksPvtLtd, NewDelhi.
2. GhoseJ.,2005. ATextbookofPharmaceuticalChemistry,S.ChandPub Ltd.,Delhi.
3. IlangoK&P.Valentina,2007.TextBookofMedicinalChemistry.VolI,KeerthiPublishers, Chennai.

REFERENCES:

1. AshutoshKar,2005.MedicinalChemistry.IIIEdition,NewAgeInternationalPublishers,New Delhi.
2. StanleyE.Manahan,2006.GreenChemistryandtheTenCommandmentsofSustainability.II Edition,ChemCharResearch,Inc Publishers Columbia,MissouriU.S.A.
3. Chatterjea,M.NandR.Shinde,2012.TextbookofMedicinalBiochemistry.JaypeeBrothers, MedicalPublishers (P)Ltd, NewDelhi.

Semester-I

15MBP105 ENVIRONMENTAL ANDAGRICULTURAL MICROBIOLOGY 4H–4C

COURSEOBJECTIVES

- Toeducatethestudentsaboutconceptsof designs of waterdistributionsystems,sewer networks,workingprinciplesanddesignofvariousphysical,chemical andbiological treatmentsystems ofwaterandwastewater.
- Tostudyaboutthebiofertilizers,plantdiseaseandincreasingsoilfertility.

COURSEOUTCOME(CO'S)

1. This coursewillprovidethestudentinsightsintotheseinvaluableareas of Environmentalmicrobiology, whichplayacrucialroleindeterminingitsfutureuse andapplications inenvironmental management.
2. Students abletoknowdetailedideaaboutbiofertilizerproductionandplantdisease.

UNIT–I

Aquaticenvironment-microbiologyofwater-waterpollutionandwaterbornepathogens.Bacteriological examination ofwater, indicator organism. Microbiology ofsewage. Chemical andbiochemical characteristicof sewage.methodsof sewagetreatment-physicalscreening,chemical,biological(sludge digestion;activated sludge,aeratingfilters,oxidationpond).

UNIT–II

Microbiologyofair-Microbialcontaminantsofair,sourcesofcontamination,microbialindicatorsofair pollution.Enumerationofbacteriainair.Airsamplers andSamplingtechniques.Airsanitation.

UNIT–III

Bioremediation–contaminatedsoil,aquifers,marinepollutants,airpollutants,stimulationofoilspills degradation.Bioremediationofairpollutants.Bioleaching–recoveryofmetalfromores–oxidationof minerals–testingforbiodegradability.

UNIT–IV

Biological nitrogen fixation - symbiotic and non-symbiotic microorganisms, root nodule formation, nitrogen fixers, hydrogenase, Nitrogenase, *Nif* gene regulation. Biochemistry ofnitrogen fixation, Rhizosphere-R:Sratio, Interactionofmicrobes withplants.Bioconversionofagriculturalwastes.

UNIT–V

Biofertilizer-Applicationofbiofertilizersandbiomanures–Acombinationofbiofertilizerandmanure applicationswithreferencetosoil,seedandleafsprays.Laboratoryandfieldapplication;Cost-benefit analysis ofbiofertilizerandbiomanureproduction.

TEXT BOOKS

1. SubbaRao,N.S.,1999.BiofertilizersinAgricultureandAgroforestry.Oxfordand IBH,NewDelhi.
2. Rangaswami,G.andD.J.Bhagyaraj,2001.AgriculturalMicrobiology.2nd Edition.PrenticeHall, NewDelhi.
3. Rao,N.S., 1995. SoilMicroorganisms andplantGrowth.OxfordandIBHPublishingCo., NewDelhi.
4. Pelzar,M.J.andM.Reid,2003.Microbiology.5th Edition.TataMcGraw-Hill.NewYork.
5. Reinheimer,G.,1991:AquaticMicrobiology.4th Edition.JohnWileyandSons.NewYork.

REFERENCES

1. JosephC.Deniel,1996,Environmentalaspects ofmicrobiology,BritishSunPublication, Chennai.
2. Abbasi, S.A. 1998. Environmental pollutionand its control. Cogent Internationalpublishers, Pondicherry.
3. KeyaSenandNicholasJ.Ashbolt2010.EnvironmentalMicrobiology:CurrentTechnologyandWater Applications.
4. Josdand,S.N.,1995. EnvironmentalBiotechnology.Himalaya PublishingHouse,Bombay.
5. Maier, R.M., Pepper, I,L., Gerba, C.P. 2009. EnvironmentalMicrobiology IIndEdition Elsevier Publisher.
6. Metcalf,R.L.andLuckmann,W.H.1994.Introductiontoinsectpestmanagement3rdedn.JohnWilley andSons,Inc.
7. Atlas,R.M.andM.Bartha,2000.MicrobialEcology-FundamentalandApplications.3rdEdition. RedwoodCityCA.Benjamin/CummingSciencePublishingCo., NewDelhi.
8. Maier,R.M.,I.L.PepperandC.P.Gerba,2000.EnvironmentalMicrobiology.1st Edition.Academic Press.NewYork.
9. Mitchell,R.,1992.IntroductiontoEnvironmentalMicrobiology;PrenticeHall.Inc.EnglewoodClifs-NewJersey.
10. Motsara,M.R.,P.BhattacharyyaandB.Srivastava,1995.Biofertilizer-Technology,Marketingand Usage.FertilizerDevelopmentandConsultantOrganization,NewDelhi.

SEMESTER I

16BTU102 CELLBIOLOGY 4H-4C

Scope:Cellbiologydealswiththephysiologicalpropertiesofcells,theirbehaviors,interactions andas wellas theirenvironment.

Objective:This paper willenablethestudents tolearnthebasics andlaystrongfoundationin understandingthecompositionofcells,howcells works isfundamentaltobiological sciences.

UNIT-I

Cell: Introductionandclassificationoforganismsbycellstructure,cytosol,compartmentalization ofeukaryoticcells,cellfractionation.CellMembraneandPermeability: Chemicalcomponentsof biologicalmembranes,organizationandFluidMosaicModel, membraneas adynamicentity,cell recognitionandmembranetransport.

UNIT-II

MembraneVacuolarSystem,Cytoskeletonand CellMotility: Structureand functionof microtubules, Microfilaments, Intermediate filaments. Endoplasmic reticulum: Structure, functionincludingroleinprotein segregation. Golgicomplex:Structure, biogenesis andfunctions includingroleinprotein secretion.

UNIT-III

Lysosomes: Vacuolesandmicrobodies:StructureandfunctionsRibosomes:Structuresand functionincludingroleinproteinsynthesis.Mitochondria:Structureandfunction,Genomes, biogenesis.Chloroplasts:Structureandfunction,genomes,biogenesisNucleus:Structureand function,chromosomes andtheirstructure.

UNIT-IV

ExtracellularMatrix: Composition, moleculesthatmediatecelladhesion, membranereceptors for extracellularmatrix, macromolecules,regulationofreceptorexpressionandfunction.

UNIT-V

Cancer: Carcinogenesis,agentspromotingcarcinogenesis,characteristicsandmolecularbasisof cancer.Signaltransduction.

References

1.Karp,G.(2013).*CellandMolecularBiology:ConceptsandExperiments*(7thed.).Hoboken, US:JohnWiley&Sons.Inc.

2.DeRobertis,E.D.P.,&DeRobertis,E.M.F.(2006).*CellandMolecularBiology*(8thed.). LippincottWilliamsandWilkins,Philadelphia.

3.Cooper,G.M.,&Hausman,R.E.(2013).*TheCell:AMolecularApproach*(6thed.). Washington,USA:ASMPress&Sunderland, D.C.,SinauerAssociates.

*4.*Becker,W.M.,Kleinsmith,L.J.,Hardin.J.,&Bertoni,G.P.(2009).*TheWorldoftheCell* (7thed.). SanFrancisco:PearsonBenjaminCummings Publishing.

SEMESTERI

16BTU112 CELLBIOLOGY PRACTICAL 3H-2C

Contents

1.Studytheeffectoftemperatureandorganicsolventsonsemipermeablemembrane.
2.Demonstrationofdialysis.
3.Studyofplasmolysisandde-plasmolysis.
4.Cellfractionationanddeterminationofenzymeactivityinorganellesusingsproutedseedor anyothersuitablesource.
5.StudyofstructureofanyProkaryoticandEukaryoticcell.
6.Microtomy:Fixation, blockmaking,sectioncutting, doublestainingofanimaltissueslike liver, pancreas,kidney.
7.Celldivisioninonionroottip.
8.Preparationof Nuclear,Mitochondrialandcytoplasmicfractions.

References

1.Karp,G.(2013).*CellandMolecularBiology:ConceptsandExperiments*(7thed.).Hoboken, US:JohnWiley&Sons.Inc.
2.DeRobertis,E.D.P.,&DeRobertis,E.M.F.(2006).*CellandMolecularBiology*(8thed.). LippincottWilliamsandWilkins,Philadelphia.
3.Cooper,G.M.,&Hausman,R.E.(2013).*TheCell:AMolecularApproach*(6thed.). Washington,USA:ASMPress&Sunderland, D.C.,SinauerAssociates.
*4.*Becker,W.M.,Kleinsmith,L.J.,Hardin.J.,&Bertoni,G.P.(2009).*TheWorldoftheCell* (7thed.). SanFrancisco:PearsonBenjaminCummings Publishing.

SEMESTERII

16BTU201 **GENETICS** **4H-4C**

Scope:Thiscoursedemonstratesthebasicconceptstogeneticsaswellastherelevanceofgenetic investigationstoman.

Objective:Theobjectiveof thecourseis topresentbasicconceptsofcontinuityandvariationin livingorganisms.

UNIT-I

Introduction: Historicaldevelopmentsinthefieldofgenetics.Organismssuitableforgenetic experimentationandtheirgeneticsignificance. CellCycle:MitosisandMeiosis:Controlpoints incell-cycleprogressioninyeast.Roleof meiosis inlifecyclesoforganisms.

UNIT-II

MendelianGenetics: Mendel'sexperimentaldesign,monohybrid,di-hybridandtrihybrid crosses, Lawof segregation&Principleofindependentassortment. Verificationof segregatesby test andbackcrosses,Chromosomaltheoryof inheritance,Allelicinteractions: Concept of dominance,recessiveness,incompletedominance,co-dominance,semi-dominance,pleiotropy, multipleallele, pseudo-allele,essentialandlethalgenes, penetranceandexpressivity.

UNIT-III

ChromosomeandGenomicOrganization: Eukaryoticnucleargenomenucleotidesequence composition –unique &repetitive DNA,satellite DNA.Centromere andtelomere DNA sequences,repetitivetransposedsequences-SINEs&LINEs.Geneticorganizationof prokaryotic andviral genome.Structureandcharacteristicsofbacterialandeukaryoticchromosome, chromosome morphology, concept of euchromatin and heterochromatin.Concept of cistron, exons, introns, geneticcode,genefunction.

UNIT-IV

ChromosomeandGeneMutations: Definitionandtypesofmutations,causesofmutations, Amestest formutagenicagents,screeningproceduresforisolationofmutantsandusesof mutants,variationsinchromosomes structure-deletion,duplication,inversionandtranslocation (reciprocalandRobertsonian).

Sexdetermination,sexlinkage,sexlinkeddiseases:Mechanismsofsexdetermination,Fragile- X-syndromeandchromosome,sexinfluenceddominance,sexlimitedgeneexpression,sex linkedinheritance.

UNIT-V

GeneticLinkage,CrossingOverandChromosomeMapping: LinkageandRecombinationof genesinachromosomecrossingover.Extrachromosomalinheritance:Rulesofextranuclear inheritance,maternal effects,maternal inheritance,cytoplasmicinheritance,organelleheredity, genomicimprinting.Evolutionandpopulationgenetics:Inbreedingandoutbreeding,Hardy Weinberg law (prediction, derivation), allelic and genotype frequencies, changes in allelic frequencies,systemsof mating,evolutionarygenetics,naturalselection.

References

1. Gardner,E.J.,Simmons,M.J.,&Snustad,D.P.(2006).*PrinciplesofGenetics*(8thed.). JohnWiley&Sons.
2. Snustad, D.P.,&Simmons,M.J.(2009).*PrinciplesofGenetics*(5thed.).USA:John WileyandSonsInc.
3. Russell,P.J.(2009).*Genetics-AMolecularApproach*(3rded.).BenjaminCummings.
4. Griffiths,A.J.F., Wessler,S.R.,Lewontin, R.C.,& Carroll, S.B.(2007).*Introductionto GeneticAnalysis*(9thed.).W.H.Freeman&Co.

Contents

1. Permanent andtemporarymountofmitosis.
2. Permanent andtemporarymountofmeiosis.
3. Mendeliandeviationsindihybridcrosses
4. Demonstrationof-BarrBody-*Rhoeo*translocation.
5. Karyotypingwiththehelpofphotographs
6. PedigreechartsofsomecommoncharacterslikebloodgroupcolorblindnessandPTC tasting.
7. Studyofpolyploidyinonionroottipbycolchicinetreatment.

References

1. Gardner,E.J.,Simmons,M.J.,&Snustad,D.P.(2006).*PrinciplesofGenetics*(8thed.). JohnWiley&Sons.
2. Snustad, D.P.,&Simmons,M.J.(2009).*PrinciplesofGenetics*(5thed.).USA:John WileyandSonsInc.
3. Russell, P. J. (2009). *Genetics- AMolecular Approach* (3rded.).Benjamin Cummings.
4. Griffiths,A.J.F., Wessler,S.R.,Lewontin, R.C.,& Carroll, S.B.(2007).*Introductionto GeneticAnalysis*(9thed.).W.H.Freeman&Co.
5. Klug,W.S.,Cummings,M.R.,&Spencer,C.A.(2009).*ConceptsofGenetics*(9thed.). BenjaminCummings.

Semester-II

16BTP203 ENVIRONMENTALBIOTECHNOLOGY 4H-4C

Objective: EnvironmentalBiotechnologyis oneofthemostimportantbranches ofBiotechnologythathas widespreadapplicationsinsustainingacleanenvironment.

Scope: This syllabusintegrates appropriateaspectsofpollution,its controlmeasures andvarious treatment strategies andthebiotainvolvedinthosestrategies.

Unit-I

Limiting factors, energy transfer and biogeochemical cycling in ecological systems; Response of microbes, plant and animals to environmental stresses; Concept of ecosystems and ecosystem management,Environmental problems-ozonedepletion,greenhouseeffect,water,airandsoil pollution, landdegradation.

Unit-II

GEMsinenvironment;Roleofenvironmentalbiotechnologyinmanagementofenvironmentalproblems, Bioremediation,advantagesand disadvantages; Insituandex-situbioremediation; slurry bioremediation; Bioremediationofcontaminated ground water and phytoremediationofsoil metals; microbiologyof degradationofxenobiotics.

Unit-III

Sewageandwastewatertreatmentandsolidwastemanagement,chemicalmeasureofwaterpollution, conventionalbiological treatment,roleofmicrophyteandmacrophytesinwatertreatment; Recent approachestobiological wastewatertreatment,compostingprocessandtechniques,useofcomposted materials.

Unit– IV

Biological decompositionof organic carbon, Nitrogen and Phosphate removal. Biological removal, biotransformation,andbiosorptionofmetalions.Aerobic-andAnaerobicdegradationof Xenobiotics. BioaugmentationfordegradationofXenobiotics.Industrial sources ofwastewater.Treatmentstrategies.

Unit-V

Biofuelsand biologicalcontrolofair pollution, plant derived fuels, biogas, landfillgas, bioethanol, biohydrogen; use of biological techniques in controlling air pollution; Removal of chlorinated hydrocarbonsfromair.

References

Evans,G.M.,&Furlong,J.C.,(2003).*EnvironmentalBiotechnology:TheoryandApplications*.England: JohnWiley&Sons Ltd.

Jördening,H.J.,&Winter,J.(2005).*EnvironmentalBiotechnology*.Germany:Wiley-VCHVerlagGmbH & Co.KGaA.

Agarwal,S.K.(2002).*EnvironmentalBiotechnology*.NewDelhi:APHPublishingCorporation.

Mara,D.(2003).*TheHandbookofWater andWastewater Microbiology*.London:Academic Press.

16BTP212 FERMENTATIONAND ENVIRONMENTAL BIOTECHNOLOGY-PRACTICALIV 5H-3C

FermentationTechnology

1. Isolationandsecondaryscreeningofindustriallyimportantmicroorganisms.
2. Auxotrophicmutants
3. ThermaldeathpointandThermaldeathtime.
4. Productionofamylaseandprotease.
5. Enzymeimmobilization
6. WineProduction analcoholdeterminationbychromicacidmethod
7. DownstreamprocessingbySolventextraction,
8. PartialpurificationbyAmmonium sulphateprecipitation,
9. PartialpurificationbyDialysis
10. QualitycheckingbySDSPAGE

EnvironmentalBiotechnology

1. Waterqualitytests forpH
2. Determinationoftotalsolids
3. DeterminationofChemicalOxygenDemand
4. DeterminationofBiologicalOxygenDemand
5. Analysis ofheavymetals (Iron/Chromium)

References

Aneja,K.R.(2004).*Experiments inMicrobiology PlantPathologyandBiotechnology*.NewDelhi:New Age International.

Metcalf,L.,&Eddy,R.(2005).*WasteWater Engineering*.NewDelhi:TataMcGrawHill.

Palvannan,T.,Shanmugam,S.,&Sathishkumar,T. (2005).*Laboratory ManualonBiochemistry, Bioprocess andMicrobiology*.Chennai:SciTechPublications IndiaPvt.Ltd,.

Semester–II

16MBP204 ENVIRONMENTAL ANDAGRICULTURAL MICROBIOLOGY 4H–4C

COURSEOBJECTIVES

- Toeducatethestudentsaboutconcepts ofdesignsofwaterdistributionsystems,sewer networks,workingprinciplesanddesignofvariousphysical,chemical andbiological treatmentsystems ofwaterandwastewater.
- Tostudyaboutthebiofertilizers,plantdiseaseandincreasingsoilfertility.

COURSEOUTCOME(CO'S)

1This coursewillprovidethestudentinsights intotheseinvaluableareas ofEnvironmental microbiology,whichplayacrucialroleindeterminingitsfutureuseandapplicationsin environmentalmanagement.

2.Students abletoknowdetailedideaaboutbiofertilizerproductionandplantdisease.

UNIT–I

Aquaticenvironment-microbiologyofwater-waterpollutionandwaterbornepathogens.Bacteriological examination ofwater, indicator organism. Microbiology ofsewage. Chemical andbiochemical characteristicofsewage.methodsofsewagetreatment-physicalscreening,chemical,biological(sludge digestion;activated sludge,aeratingfilters,oxidationpond).

UNIT–II

Microbiologyofair-Microbialcontaminantsofair,sourcesofcontamination,microbialindicatorsofair pollution.Enumerationofbacteriainair.Airsamplers andSamplingtechniques.Airsanitation.

UNIT–III

Bioremediation–contaminatedsoil,aquifers,marinepollutants,airpollutants,stimulationofoilspills degradation.Bioremediationofairpollutants.Bioleaching–recoveryofmetalfromores–oxidationof minerals–testingforbiodegradability.

UNIT–IV

Biological nitrogen fixation - symbiotic and non-symbiotic microorganisms, root nodule formation, nitrogen fixers, hydrogenase, Nitrogenase, *Nif* gene regulation. Biochemistry ofnitrogen fixation, Rhizosphere-R:Sratio, Interactionofmicrobes withplants.Bioconversionofagriculturalwastes.

UNIT–V

Biofertilizer-Applicationofbiofertilizersandbiomanures–Acombinationofbiofertilizerandmanure applicationswithreferencetosoil,seedandleafsprays.Laboratoryandfieldapplication;Cost-benefit analysisofbiofertilizerandbiomanureproduction.

SUGGESTEDREADINGS

TEXT BOOKS

1.SubbaRao,N.S.(1999). *BiofertilizersinAgricultureand Agroforestry*.OxfordandIBH,NewDelhi.

2.Rangaswami,G.,andBhagyaraj,D.J.,(2001).*AgriculturalMicrobiology*.(2nded.). PrenticeHall,New Delhi.

3.Rao,N.S.(1995). *SoilMicroorganisms andplantGrowth*.OxfordandIBHPublishingCo.,NewDelhi.

4.Pelzar,M.J.,andReid,M., (2003). *Microbiology*.(5thed.).TataMcGraw-Hill,NewYork.

5.Reinheimer,G.(1991). *AquaticMicrobiology*.(4thed.).JohnWileyandSons,NewYork.

SEMESTER–III

16PHU304A RENEWABLEENERGYANDENERGY HARVESTING (SEC1A)

Objective: Renewableenergyanddifferentmethodsofharvestingthemisveryimportantinthepresent scenario. This papergives details aboutdifferenttypes ofrenewableenergyanddifferentmethods of harvestingthem.

UNIT I

FossilfuelsandAlternateSourcesofenergy:Fossilfuelsandnuclearenergy,theirlimitation,needof renewableenergy,non-conventionalenergy sources.Anoverviewofdevelopmentsin OffshoreWind Energy,Tidal Energy,Waveenergysystems, solarenergy,biomass,biochemical conversion,biogas generation,

UNIT II

Solarenergy:Solarenergy,itsimportance,storageofsolarenergy,solarpond,nonconvectivesolarpond, applicationsofsolarpondandsolarenergy,solarwaterheater,flatplatecollector,solardistillation,solar cooker,solargreenhouses,solarcell,absorptionairconditioning.Needandcharacteristics ofphotovoltaic (PV)systems,PVmodels andequivalentcircuits,andsuntracking systems.

UNIT III

WindEnergyharvesting:FundamentalsofWindenergy,WindTurbinesanddifferentelectricalmachines inwindturbines,Powerelectronicinterfaces,andgridinterconnectiontopologies.OceanEnergy:Ocean EnergyPotentialagainstWindandSolar,WaveCharacteristics andStatistics,WaveEnergyDevices. TidecharacteristicsandStatistics,TideEnergyTechnologies,OceanThermalEnergy,OsmoticPower, OceanBio-mass.

UNIT-IV

HydroEnergy:Hydropowerresources,hydropowertechnologies,environmentalimpactofhydropower sources. PiezoelectricEnergyharvesting:Introduction,Physicsandcharacteristicsofpiezoelectriceffect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectricgenerators, Piezoelectricenergyharvestingapplications,Humanpower.

UNIT-V

ElectromagneticEnergyHarvesting:Lineargenerators,physicsmathematicalmodels,recentapplications, GeothermalEnergy:GeothermalResources,GeothermalTechnologies. Carboncapturedtechnologies, cell,batteries,powerconsumption,EnvironmentalissuesandRenewablesources ofenergy,sustainability.

ReferenceBooks:

1. Non-conventionalenergysources,B.H.Khan,McGrawHill
2. Solarenergy,Suhas PSukhative,TataMcGraw-HillPublishingCompany Ltd.
3. Renewable Energy, Power for a sustainable future, Godfrey Boyle, 3rd Edn., 2012, Oxford UniversityPress.
4. RenewableEnergy,3rdEdition,
5. SolarEnergy:ResourceAssesmentHandbook, PJayakumar,2009
6. J.Balfour,M.ShawandS.Jarosek, Photovoltaics,LawrenceJ Goodrich(USA).
7. http://en.wikipedia.org/wiki/Renewable_energy

Semester-IV

16CHU404A GREENMETHODSINCHEMISTRY 3H

3CInstructionHours/week:L:3T:0P:0Marks:Internal:40External:60Total:100

Scope

Thecoursedeals withthetheorybehindthegreenchemistry,realworldcasesingreenchemistryand developingenvironmentallyfriendlychemicals.

Objectives

Thiscourseenablesthestudentsto

1. Understandthetwelveprinciplesofgreenchemistry
2. Understandthecatalysisinvolvedingreenchemistry
3. Understandtheprocessinvolvedin therealwordcaseslikeSurfactants forCO_2, environmentally safemarineantifoulantandplastic (polylacticacid)madefromcorn.

Methodology

Blackboardteaching,Powerpointpresentationandgroupdiscussion.

UNIT I

TheoryandHand-onExperiments

Introduction:Definitions ofGreenChemistry.Briefintroductionoftwelveprinciples of GreenChemistry, withexamples,specialemphasis onatomeconomy,reducingtoxicity, greensolvents,

UNIT II

GreenChemistryandcatalysis andalternativesources ofenergy,Greenenergyandsustainability

UNIT III

ThefollowingRealworldCases inGreenChemistryshouldbe discussed:

Surfactants forcarbondioxide–Replacing smogproducingandozonedepletingsolvents withCO2for precisioncleaninganddrycleaningofgarments.

UNIT IV

Designingofenvironmentally safemarineantifoulant.

Rightfitpigment:Syntheticazopigments toreplacetoxicorganicandinorganicpigments.

UNIT V

Anefficient,greensynthesis ofacompostableandwidelyapplicableplastic (polylacticacid)madefrom corn.

SuggestedReadings

TextBooks:

1. Anastas,P.T. &Warner,J.K.(2005).*GreenChemistry-TheoryandPractical*.Oxford UniversityPress.
2. Matlack,A.S.(2001).*IntroductiontoGreenChemistry*.MarcelDekker.

ReferenceBooks

1. Cann,M.C.& Connely,M.E.(2000).*Real-Worldcases inGreenChemistry*,American ChemicalSociety.Washington.

16CHU414A GREENMETHODSINCHEMISTRYPRACTICAL 3H

1CInstructionHours/week:L:0T:0P:3Marks:Internal:40External:60Total:100

Scope

Thislabcoursedeals withtheexperiments whichinvolvetechniques usedingreenchemistry

Objectives

This courseenablethestudentto

1. Understandtheprinciples andthepracticalaspectsofgreenchemistry

Methodology

Greenermethodsofpreparationandcharacterisation

Practical's

1. Preparationandcharacterizationofbiodieselfromvegetableoil.
2. ExtractionofD-limonenefromorangepeelusingliquidCO2preparedfromdryice.
3. Mechanochemical solventfreesynthesis ofazomethine.
4. Solventfree,microwaveassistedonepotsynthesis ofphthalocyaninecomplexof copper(II).

SuggestedReadings

TextBooks:

1. Anastas,P.T. &Warner,J.K.(2005).*GreenChemistry-TheoryandPractical*.Oxford UniversityPress.
2. Matlack,A.S. (2001).*IntroductiontoGreenChemistry*.MarcelDekker
3. Cann,M.C.& Connely, M.E. (2000). *Real-Worldcases inGreenChemistry*,American ChemicalSociety.Washington.

ReferenceBooks

1. Ryan,M.A.&Tinnesand,M.(2002).*IntroductiontoGreenChemistry*.American ChemicalSociety.Washington.
2. Lancaster, M.(2010).*GreenChemistry:Anintroductorytext.*2ndEdition.RSC publishing.

KARPAGAM ACADEMY OFHIGHEREDUCATION
B.A. ENGLISHLITERATURE

GREENSTUDIES

15EGU506 **4C**

Scope: Thispaperprovokesthestudentstoknowtheimportanceofnature anditsvalues.Itkindlesthem todevelop ecologicalvalues.

Objective: Tonurture respectforanaturalworld
Todevelopdeepecologicalvalues
Toenablestudents becomeglobalcitizens whoareknowledgeableaboutand inspiredtotakeresponsibilityforthesustainabilityoftheworld-humanandnon-human-thatenablethemtoliveanddevelopaccordingtotheirnature.

Note: This beingaself-studycourse,itwillnotbetaughtformallyas apartofthetime-table. Learners enrolledontheBA(English)programmeareexpectedtofollowitontheirownonthe basis ofthe readingmaterialprovidedtothem.

UNIT I:POETRY:DETAILED

1. TheGarden–Andrew Marvell
2. Tree–TinaMorris
3. OurCasuarinaTree–ToruDutt
4. OnKillingaTree–Gieve Patel
5. Thereis anotherSky–EmilyDickinson

UNITII:POETRY: NON-DETAILED

1. The PreludeBook1–WilliamWordsworth
2. Snakes–A.K.Ramanujan
3. PraytoWhatEarth –HenryDavid Thoreau
4. Spring– Edna St. VincentMillay
5. GodtheArtist–AngelaMorgan

UNIT III:PROSE:NON-DETAILED

1. Nature–Emerson

UNIT IV:DRAMA:NON-DETAILED

1. RedOleander-RabindranathTagore

UNIT V:FICTION

1. TheNectarintheSieve–KamalaMarkandaya
2. Tess oftheD'Urbervilles– Thomas Hardy

Semester-II

17CHP204 INDUSTRIALCHEMICALSANDENVIRONMENT 4H 4C

Scope

Thecoursedeals withtheindustrialchemicals andtheirimpactontheenvironment.

Objectives

Thecourseenables thestudentsto

1. Understandtheindustrialgases andinorganicchemicals whichhaveanimpactonthe environment.
2. Understandaboutthegeneralprinciples ofmetallurgy.
3. Understandtheenvironmentandits segments.
4. Understandaboutthewaterpollutionandwatertreatment.
5. Understandabouttheenergyandtheenvironment.

Methodology

Blackboardteaching,Powerpointpresentationandgroupdiscussion.

UNIT I

IndustrialGases andInorganicChemicals:

*IndustrialGases:*Largescaleproduction,uses,storageandhazardsinhandlingofthefollowing gases:oxygen,nitrogen,argon,neon,helium,hydrogen,acetylene,carbonmonoxide,chlorine, fluorine,sulphurdioxideandphosgene.

*InorganicChemicals:*Manufacture,application,analysisandhazardsinhandlingthefollowing chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, common salt, borax, bleaching powder, sodium thiosulphate, hydrogen peroxide, potash alum, chrome alum, potassiumdichromateandpotassiumpermanganate.

UNIT II

IndustrialMetallurgy:

GeneralPrinciples ofMetallurgy:

Chiefmodes ofoccurrenceofmetalsbasedonstandardelectrodepotentials.Ellinghamdiagrams forreductionofmetaloxides usingcarbonas reducingagent.

Hydrometallurgy,methodsofpurificationofmetals(Al,Pb,Ti,Fe,Cu,Ni,Zn):electrolytic, oxidative refining, Krollprocess, Parting process, Van Arkel-de Boer process and Mond's process.Preparationofmetals(ferrousandnonferrous)andultrapuremetalsforsemiconductor technology.

UNIT III

Environmentandits segments:

Ecosystems.Biogeochemicalcycles ofcarbon,nitrogenandsulphur.

Air Pollution: Major regions of atmosphere. Chemical andphotochemical reactions in atmosphere.Airpollutants:types,sources,particlesizeandchemicalnature;Photochemical smog:itsconstituentsandphotochemistry.Environmental effectsofozone,Majorsourcesofair pollution.

Pollution by SO_2, CO_2, CO, NOx, H_2S and other foul smelling gases. Methods of estimation of CO, NO_x, SO_x and control procedures. Effects of air pollution on living organisms and vegetation. Greenhouse effect and Global warming, Ozone depletion by oxides of nitrogen, chlorofluorocarbons and halogens, removal of sulphur from coal. Control of particulates.

Unit IV

Water Pollution:

Hydrological cycle, water resources, aquatic ecosystems, Sources and nature of water pollutants, techniques for measuring water pollution, Impacts of water pollution on hydrological and ecosystems.

Water purification methods. Effluent treatment plants (primary, secondary and tertiary treatment). Industrial effluents from the following industries and their treatment: electroplating, textile, tannery, dairy, petroleum and petrochemicals, agro, fertilizer, etc.

Sludge disposal. Industrial waste management, incineration of waste. Water treatment and purification (reverse osmosis, electrodialysis, ion exchange). Water quality parameters for wastewater, industrial water and domestic water.

Unit V

Energy & Environment:

Sources of energy: Coal, petrol and natural gas. Nuclear fusion/fission, solar energy, hydrogen, geothermal, tidal and hydel, etc. Nuclear pollution: Disposal of nuclear waste, nuclear disaster and its management.

Biocatalysis:

Introduction to biocatalysis: Importance in "Green chemistry" and chemical industry.

SUGGESTED READINGS:

Text Books:

1. Stocchi, E. (1990). *Industrial Chemistry Vol-I*. UK: Ellis Horwood Ltd.
2. Felder, R.M., & Rousseau, R.W. (2010). *Elementary Principles of Chemical Processes*. (III Edition). New Delhi. Wiley India Pvt. Ltd
3. Kent, K.A. (1997). Riegel's Handbook of Industrial Chemistry (IX Edition). New Delhi: CBS Publishers and Distributors Private Limited.

Reference Books:

1. Umare, S.S. & Dara, S.S. (2014). *A Textbook of Engineering Chemistry* (V Edition). New Delhi: S. Chand & Company Ltd.
2. De, A. K. (2005). *Environmental Chemistry* (III Edition). New Delhi: New Age International Publishers (P) Ltd.
3. Khopkar, S.M. (1993). *Environmental Pollution Analysis*. New Delhi: Wiley Eastern Ltd.

Semester-II

17CHP206 WATERMANAGEMENT 4C

Scope

Itisaskilldevelopmentcoursewhichenhances theabilityofstudentsindevelopingtheskillsin wateranalysis.

Objectives

Thecourseenables thestudentsto

1. UnderstandtheImportanceofdrinkingwater
2. Understandthewaterpollution
3. Understandtheparameterstobecheckedduringwater analysis.

Methodology

Selfstudy.

UNIT-I

WaterQualityParameters andTheirDetermination

Physical,chemicalandbiologicalstandards,significanceofthesecontaminantsoverthequality andtheirdeterminations–electricalconductivity–turbidity–P^H,totalSolids,TDS,alkalinity–hardness–chlorides– BOD–COD–TOC–Nitrate–Sulphate–Fluoride–Iron–Arsenic–Mercury.

AlgalandPlanktonanalysis–Biomassandchlorophyllestimation–microbialestimation–StandardPlateCount–MPNofColiforms–estimationofMPN–Bioassay–requirementsof Bioassay.

UNIT-II

GroundandSurfaceWaterPollutionandControlMeasures

Surface water and ground water pollution – harmful effects – Pollution of major rivers – Protectinggroundwaterfrompollution–Groundwaterpollutionduetofluoride,Iron,chromiun andarsenic–Sources, illeffects andtreatmentmethods.

Waterpollutioncontrol–stabilizationoftheecosystem–wastetreatmentreclamation–various approaches topreventandcontrolwaterpollution.

UNIT-III

WaterTreatment Methods

Treatmentforcommunitysupply–screening,sedimentation,coagulation, fillteration–Removal ofmicroorganisms–chlorination,addingbleachingpowder, UVirradiationandozonation.

Desalinationof blackishwater–electrodialysis–Reverseosmosis- Demineralizationof water forIndustrialpurposes–boilerproblems–scaleandsludge formation–preventionofscale formation–Internalandexternaltreatment–limesoda–Zeoliteprocess.

UNIT-IV

SewageandIndustrial EffluentTreatment

Sewage –characteristics – purposeofsewage treatment – methodsofsewage treatment – Primary–secondaryandtertiary–roleofalgaeinsewagetreatment.

Typesofindustrialwastes–treatment ofeffluentswithorganicand inorganicimpurities – Treatmentofwastewatersfrom specificindustries–PulpandPaper–chemicalindustry–food processing–waterHyacinthinthetreatmentofindustrialeffluents.

UNIT-V

WaterManagement

Waterresourcemanagement–rainwaterharvestingmethods–percolationponds–checkdams –rooftopcollectionmethods–Watermanagementinindustries–Recyclingandreuseofwaste water– Metalrecoveryfrommetalbearingwastewater– RecoveryofZincandNickel.

SuggestedReadings

TextBooks:

1. P.C.JainandMonicaJain,(1993),EngineeringChemistry,DhanpatRaiandSons.
2. R.K.TrivedyandP.K.Goel,(1986), ChemicalandBiologicalmethods forWaterPollution Studies,EnvironmentalPublications.

ReferenceBooks

1. AsimK.Das,(2010),EnvironmentalchemistrywithGreenChenmistry, ArunabhaSen, Books andAllied(P)Ltd, Kolkata-9.
2. AnubhaKaushikandCP.Kaushik,(2014).Perspectivesinenvironmentalstudies, 4th Edition,Newage InternationalPubhilishers PLtd,NewDelhi-2.

15BECC204

ENVIRONMENTAL STUDIES3003 100

OBJECTIVES

1. Togr,·eacomprehensive1ns1ght intonl11u.ralresourceJ.ecosystemandbiod.t,mity.
2 Toeducatethewaysandmc:inso(thcm,·u'Onmcnt
lToprotectthoenvironment from,.....,...l)'PCSofpolluhon.
4. Toin1e_r1somefuudamemalkno"ledgeonhunuinwelfaremeasures.

UNIT IU'/TRODUCTIONTO E"'YIRON)IENTALSTUDIES ANDNAT RAL RESOURCES

Defmit.ion.ScopeandImportance- Needforpublicawareness -Forestresources: Useandover-exploitation,deforestation• Waterresources-Useandover-utilizationofswfaceandgroundwater.floods.droughLconflictsoverwater-Landresources-• Land asaresource.landdegradation.maninducedlandslides.soilerosionanddesertification–Mineralresources:Useand exploitation.environmentaleffectsofextractingandusingmineralresources-Foodresources-worldfoodproblems.changes causedbyagricultureandovergrazing.effectsofmodernagriculture-Energyresoerees-Growingenergyneeds.renewableand non renewableenergysources, useofalternateenergysources-roleofanindi,idua.l inconservationofnaturalresources.

UNITU ECOSYSTEM

Cru.'ffltS1ryand Environment-Environmentalsegments,CompositionandStrucrureofatmosphere- Conceptofanecosysiern• Structure.componenL<and function ofonecosystem Energy nowin theecosystem - Foodchain. food webandecological pyromids.Structureand functionofTerrestrialecosystem (Forest. DesertondGnwbndecosystem)andAquaticecosySlcm (Fn,sh"•tcr•ndMorine ecosystem)

UNIT IllBIODIVERSITY 9

lnlmducuoo10 biodiversity, Definition-G<:ncticdiversity. Species di"enity andEcosystem diversity. Biogcograplucal classification ofIndia.lmportanceofbiodiversjty-Value ofbiodiversity-HotSpotsofbiodiversity-Threats tobiodiversity-EndangeredandEndemicSpecies ofIndia–Cmsem1tionofbiodiversity-In-SituandEx-Situconservationofbiodiversity.

UNIT IYE'.\VIRO:-!ME"'TALPOLLUTIO:-!

Definition- Causes,effectsandcontrolMeasures ofAirpollution,Waterpollution.Soilpollution,Marinepollution, NoisepollutionandThermalpollution.Solidwastemanagemem-Dauses,effectsandcontrolmeasuresofurbanandindustrialwastes• Roleofanindividualinpreventionofpollution–Disastermanagementt-earthquake.tsunami,cycloneandlandslides.

UNIT\'SOCIALISSUES ANDENVIRONMENT9

From unsusuinablctoSustainabledc,elopmc-nt.Urban problemsrelatedto energy sources. waterconscrv111ion. Ra,n water hanesung and watershedmanagement,Reseulementand rch•bilitationof J""<ll)lo. ,tsproblems•nd ceocems, En\lronmonulethics-Issuesandpos.siblc soluuons-Climatechange-Gn:cnhouseeffectandglobalworming.oc\dmn.OIOIIC l•ycrcl<plctoon.Wastelandrcclon»lion.En"ronment ProtectionAct-llumanRights-ValueEdutotion.RoleofInfonnaboo TechnologyinEnvironmentandhumanhealth-Populationgrowth, variationofpopubuon 3.IDOOSnations-PopuJation cxplosK>n.

TOTAL 43PERIODS

TL'\,,-BOOK

S. ~o.	Autbor(s)Name	Tltleofthebook	Publisher	\'n..rof PublInlloa
I	Ravikrishnan,A	En,ironrnent.al Science	SriKrishnaHitechPublishing CompanyPrivateLtd.,Chennai	2012
2	Anubhakaushik C.P.Kaushik	En\ironment:31Scienceand Engin..,.,ng	NewAg<ln1om>1ionol(p)Ltd.. NewDclhi	2010

REfEREXCES

S, Xo.	Author(s) .Nanlc·	TUI•orthebook	Publlslu:r	l'ɒrof PublkaUoo
I	LindaD.Williams	En,·ironmentalScienceDemystified	TotaMcGraw-HillPublishing CompanyLimned,NewDelhi.	2005
2	TylerMillerG.Jr	En,·ironmentalScience	Tbomsoo&ThomsonPublishers, New Dclhi	200l

WUIREfEREXCES

1. http:/people.eku.edu/ritchisong,en\'scinotesl.html
2. http,nplel.ac.in/courses.php?disciplineId=1203.www.newagepublishers.comsamplechapter!00281.
3. www.uneseo.org/exlifieldibeijing,scienc:cl>.htm.
4. \\1\\-W.infinitepowcr.org/educ3tion.htm

ISBEEEJ0SRENEWABLE ENERGY SOURCES LTPC3003

OBJECTIVES

- Togaintheknowledgeaboutenvironmentalaspectsofenergyutilization.
- Tounderstandthebasicprinciplesofwindenergyconversion.solarcells,photovoltaic conversion.
- Tounderstandthebasicprinciplesfuelcell.Geothermalpowerplants.
- Togaintheknowledgeabouthydroenergy.

INTENDED OUTCOMES

Atthesuccessfulcompletionofthiscourse.thestudentisexpectedtohave/beableto:

- Listandgenerallyexplainthemainsourcesofenergyandtheirprimaryapplicationsin theUS,andtheworld.
- Describethechallengesandproblemsassociatedwiththeuseofvariousenergysources, includingfossilfuels,withregardtofuturesupplyandtheenvironment
- Discussremedies/potentialsolutionstolhesupplyandenvironrnemal issuesassociated withfossilfuelsandotherenergyresources.
- Listanddescribe theprimaryrenewableenergyresourcesandtechnologies.

U ITI INTRODUCTION 9

Energyscenario-Different typesofRenewable Energy Sources-Environmentalaspects of energyutilization-EnergyConservationandEnergyEfficiency-NeedsandAdvantages.Energy ConservationAct2003.

UNITII SOLARENERGY 9

Introduction 1osolarenergy: solarradiation,availability,measurement andestimation- Solar thermalconversion devices andstorage-solarcellsandphotovoltaicconversion-PVsystems-MPPT.ApplicationsofPVSystems-solarenergycollectorsandstorage,

UNITIllWINDE ERCY 9

Introduction- Basicprinciplesofwindenergyconversion-components ofwindenergy conversionsystem-siteselectionconsideration-basic–Types ofwindmachines.Schemes for electricgeneration- generator control.loadcontrol,energy storage- applications ofwind energy-Interconnectedsystems.

UNITIVHYDRO ENERGY9

Hydropower,classificationofhydro power.Turbine selection,Oceanenergy resources, ocean energyroutes.Principles ofoceanthermalenergyconversion systems,oceanthermalpower plants.Principlesofoceanwaveenergyconversionandtidalenergyconversion.

UNITVOTHERSOURCES 9

Bio energyandtypes–Fulcell.Geo-thermal powerplants;Magneto-hydro-dynamic(MHD} energyconversion.

TOTAL:45HOURS

TEXT BOOKS

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	Rai.G.D	Non-conventional resources of energy	Khanna publishers ,Fourth edition	2010
2	Khan.B.H	Non-Conventional Energy Resources	The McGraw Hills, Second edition	2009

REFERENCES

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	Rao.S. & Parulekar	Energy Technology	Khanna publishers, Fourth edition	2005
2	Godfrey Boyl	Renewable Energy: Power sustainable future	Oxford University Press, Third edition	2012
3	John W Twidell and Anthony D Weir	Renewable Energy Resources	Taylor and Francis	2006

WEBSITES

1. www.energycentral.com
2. www.catelelectricpowerinfo.com

15BEEE603 ENERGY MANAGEMENT, UTILIZATION AND ENERGY AUDITING

L T P C 3 0 0 3

OBJECTIVES

- To gain the knowledge about energy management.
- To understand the basic concepts in economic analysis in energy management.
- To understand the basic principles of energy audit.

INTENDED OUTCOMES

- The students will be able to understand the concepts of economic aspects, analysis of energy management and energy auditing.

UNIT I ENERGY MANAGEMENT **9**

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting –Energy Auditor and Energy Manager – Eligibility, Qualification and functions - Questionnaire and check list for top management.

UNIT II ECONOMIC ASPECTS AND ANALYSIS **9**

Economics analysis – Depreciation Methods, time value of money, Calculation of simple payback, net preset value, internal rate of return, present worth method, replacement analysis, life cycle costing analysis.

UNIT III ILLUMINATION, HEATING AND WELDING **9**

Nature of radiation – definition – laws – photometry – lighting calculations – design of illumination systems (for residential, industrial, commercial, health care, street lightings, sports, administrative complexes) - types of lamps - energy efficiency lamps. Methods of heating, requirement of heating material – design of heating element – furnaces – welding generator – welding transformer and its characteristics.

UNIT IV ELECTRIC TRACTION **9**

Introduction – requirements of an ideal traction system – supply systems – mechanics of train movement – traction motors and control – multiple units – braking – current collection systems – recent trends in electric traction.

UNIT V BASIC PRINCIPLES OF ENERGY AUDIT **9**

Energy audit – definition, concept, type of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes – Energy audit of industries – energy saving potential, energy audit of process industry, thermal power station, building energy audit.

TOTAL: 45 HOURS

TEXT BOOKS

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	W.C.Turner Steve Doty	Energy Management Handbook	John Wiley and Sons 7th Edition	2009
2	E. Openshaw Taylor	Utilization of Electrical Energy in SI Units'	Orient Longman Pvt.Ltd	2003
3	B.R. Gupta	Generation of Electrical Energy	Eurasia Publishing House (P) Ltd, New Delhi	2003

REFERENCES

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	H. Partab	Art and Science of Utilisation of Electrical Energy	Dhanpat Rai and Co, New Delhi	2004
2	C.L. Wadhwa	Generation, Distribution and Utilization of Electrical Energy	New Age International Pvt.Ltd	2003
3	J.B. Gupta	Utilization of Electric Power and Electric Traction	S.K.Kataria and Sons	2002

16PYU451 **ENVIRONMENTAL SCIENCES** **1 0 0 0 100**

OBJECTIVES:

- Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms.
- It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

INTENDED OUTCOMES:

Upon completion of the course the student shall be able to:

- Create the awareness about environmental problems among learners.
- Impart basic knowledge about the environment and its allied problems.
- Develop an attitude of concern for the environment.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Strive to attain harmony with Nature.

Unit-I

The Multidisciplinary nature of environmental studies - Natural Resources - Renewable and non-renewable resources - Natural resources and associated problems **-** Forest resources - Water resources - Mineral resource - Food resources - Energy resources - Land resources - Role of an individual in conservation of natural resources.

Unit-II

Ecosystems - Concept of an ecosystem – Introduction – types - characteristic features - structure and function of the ecosystems - Forest ecosystem - Grassland ecosystem - Desert ecosystem - Aquatic ecosystems (ponds – streams – lakes – rivers – oceans -estuaries).

Unit- III

Environmental Pollution - Air pollution - Water pollution - Soil pollution.

Contd..

TEXT BOOKS:

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Y.K.Sing	Environmental Science	New Age	2011

REFERENCES:

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Agarwal.K.C	Environmental Biology	Nidi publications	2001
2	Environmental Biology	The Biodiversity of India	Mapin publishing	2013
3	Brunner R.C	Hazardous Waste Incineration	McGraw Hill Inc	2011

WEBSITES:

- www.environmentalsciences.org.
- www.ensci.iastate.edu
- www.biodiversitya-z.org.

19ART103	ENVIRONMENTAL STUDIES								SEMESTER-I
Marks	Internal	40	External			60	Total	100	Exam Hours	3
Instruction Hours /week	L	2	T	0	P/S	0	Credits			2

COURSE OBJECTIVE :

- To create the awareness about environmental problems among people.
- To develop an attitude of concern for the environment.
- To motivate public to participate in environment protection and improvement.

COURSE OUTCOME :

- Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

UNIT I INTRODUCTION - ENVIRONMENTAL STUDIES & ECOSYSTEMS

Environment Definition, Scope and importance; Ecosystem, Structure and functions of ecosystem. Energy flow, Food chains and food webs, Ecological succession. Classification of ecosystem. Forest ecosystem, Grassland Ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT II NATURAL RESOURCES - RENEWABLE AND NON-RENEWABLE RESOURCES

Natural resources - Renewable and Non – Renewable resources. Land resources and land use change, Land degradation, soil erosion and desertification. Forest resources - Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water resources - Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water. Use of alternate energy sources, growing energy needs, case studies. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT III BIODIVERSITY AND ITS CONSERVATION

Levels of biological diversity - genetic, species and ecosystem diversity.Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value. Bio-geographical classification of India. Biodiversity patterns (global, National and local levels). Hot-spots of biodiversity. India as a mega-diversity nation. Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT IV ENVIRONMENTAL POLLUTION

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution. Nuclear hazards and human health risks. Solid waste management and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Case studies.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT

Concept of sustainability and sustainable development. Water conservation - Rain water harvesting, watershed management. Climate change, global warming, ozone layer depletion, acid rain and its impacts on human communities and agriculture. Environment Laws (Environment Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act).

19ARS323	CLIMATE RESPONSIVE ARCHITECTURE								SEMESTER-III
Marks	Internal	60	External			90	Total	150	Exam Hours	6
Instruction Hours /week	L	1	T	0	P/S	3	Credits			3

COURSE OBJECTIVE:

- To study about climatic factors and its influence of external and internal factors and To familiarize students with the design strategies as per climatic conditions by utilization of optimum solutions

COURSE OUTCOME:

- An understanding of heat balance in human beings.
- An understanding of the effect of sun and wind on buildings.
- An understanding of material effects in buildings.
- Ability to design buildings with respect to climate.

UNIT 1 CLIMATE & MICROCLIMATE

Introduction of the earth formation,sun-Latitide , longitude, Altitude-Factors that determine climate -Climatic zones of the world,India –Climate classifications -characteristics-Thermal comfort-Mahony's tables,Psychrometricchart,Bioclimatic chart and fanger point scale- Microclimate-Urban heat Island-Built forms – Natural and manmade features – vegetation

UNIT- II SOLAR GEOMETRY- HEAT TRANSFER-BUILDING ENVELOPE CONCEPTS

Movement of sun- Sun path diagram – Solictice-Overheated period–Solar shading–Shadow angles – Types of shading devices and materials,techniques- Transfer of heat through solids -Wall,roof,ground,glass,other materials– Definitions-Conductivity, Resistivity, Emmissivity,Absorbtance– Surface resistance and air cavities– Air to air transmittance (U value) –Time lag and decrement factor – Material Properties-calculations

UNIT- III AIR MOVEMENT STRATEGIES –VENTILATION PRINCIPLES

The wind –wind patterns – Air currents around the building – Air movement through the buildings – Fenestration techniques– Thermally induced air currents – Stack effect, Venturi effect ,bernoullistheory,Finwalls,windtowers etc

UNIT- IV DESIGN STRATEGIES -PASSIVE,ACTIVEAND DAYLIGHITNG

Heating:principles – Passive and Active solar-Direct gain systems - Glazed walls, Bay windows,sun space- Indirect gain systems-Trombe wall,SolarChimney,Roof pond, Roof radiation trap, Solarium etc.Cooling: General principles – Evaporative cooling, Nocturnal radiation cooling,induced ventilation, earth sheltering, Berming, Wind Towers, earth air tunnels, Curved Roofs & Air Vents, Insulation, Vary Thermal wall etc.-Daylighting concepts – Natural – Artificial – WWR – Light shelf etc

UNIT- V DESIGN RECOMMENDATIONS FOR CLIMATE & SUSTAINABILITY IN ARCHITECTURE

Design strategies recommended in warm humid, hot and dry,Moderate , composite and cold climates-Fundamentals of Sustainability- green buildings – rating sstems -Biomimicry -Case studies of buildings

-Excercises involving design strategies receommended

SUGGESTED READINGS :

1. MiliMajunder, Teri – Energy – Efficient Bldgs in India – Thomson Press , New Delhi – 2001
2. Arvind Krishnan & Others – Climate Responsive Architecture, Tata Mcgraw –Hill New Delhi 2001.
3. Heating,Cooling and Lighting – Norbert Lechner, October 2014
4. Charles. J. Kibert, 'Sustainable Construction' John Wiley and sons Inc, USA.2013.
5. N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.2012
6. O.H. Koenigsberger and others (1993), Manual of Tropical Housing and Building –Part I - Climate design, Orient Longman, Madras, India.
7. Sun wind and light- Mark Dekay , G. Z. Brown, Feb 2013

19ART502	LANDSCAPE ARCHITECTURE								SEMESTER-V
Marks	Internal	40	External			60	Total	100	Exam Hours	3
Instruction Hours /week		L	2	T	0	P/S	0		Credits	2

COURSE OBJECTIVE:

- To introduce the various aspects of outdoor design and site planning in enhancing and improving the quality of built environment, functionally and aesthetically.
- To stress on the role of landscape design in sustainability, to provide an overview of ecological balance and impacts of human activities and the need for environmental protection and landscape conservation.
- To provide familiarity with the various elements of landscape architecture and the principle of landscape design.

COURSE OUTCOME:

- Awareness of the role of landscape design with respect to macro scale of sustainability and ecology as well as in the micro scale of shaping of outdoor environments.
- Knowledge about the elements of landscape design and their scope.
- Sensitivity towards evolution of different garden and landscape design across time and context.
- An understanding of landscape design with respect to site planning and different functional typologies of spaces

UNIT- I INTRODUCTION TO LANDSCAPE ARCHITECTURE AND DESIGN

Introduction to landscape architecture; role of landscape design in architecture; Introduction to site planning, site analysis & landscape design. Site selection criteria for landscape projects.

UNIT- II ELEMENTS IN LANDSCAPE DESIGN

Hard and soft landscape elements, Plant materials, classification, characteristics, use and application in landscape design; Water and Landform.

UNIT - III GARDEN DESIGN IN HISTORY

Landscape and garden design in history - French, English, Japanese, Renaissance and Moghul . Study of notable examples.

UNIT - IV URBAN LANDSCAPE

Significance of landscape in urban areas; road landscaping; waterfront development, landscaping of residential areas , Industrial landscaping .

UNIT- V LANDSCAPE DESIGN

Basic principles of planting design; Spatial development in landscape design; Detailed landscape design of any small project including paving and street furniture design

SUGGESTED READINGS :

1. Motloch, J.L., 'An Introduction to Landscape Design', US: John Wiley and Sons, 2001.
2. Michael Laurie, 'Introduction to Landscape Architecture', Elsevier, 1986.
3. Sauter D; 'Landscape Construction', Delmar Publishers; 2000.
4. Geoffrey And Susan Jellico, 'The Landscape of Man', Thames And Hudson, 1987
5. 'Time Saver Standards for Landscape Architecture', McGraw Hill, Inc, 1995.
6. Grant W Reid, 'From Concept to Form in Landscape Design', Van Nostrand Reinhold Company, 1993.
7. Albert J. Rutledge, 'Anatomy of a Park', McGraw-Hill Book Company, 1971.
8. Richard P. Dober, 'Campus Landscape', John Wiley and Sons; 2000.
9. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley and Sons Inc., 2004.
10. Brian Hacket, 'Planting Design', Mc Graw Hill Inc, 1976.
11. T.K. Bose and Chowdhury, 'Tropical Garden Plants in Colour', Horticulture And Allied Publishers, Calcutta, 1991.
12. Rahoul B Singh, 'Gardens of Delight- Indian Gardens through the Ages', Lustre Press, Roli Books, 2008.

ELECTIVES

19ARET931	DISASTER MANAGEMENT								SEMESTER-IX
Marks	Internal	40	External			60	Total	100	Exam Hours	3
Instruction Hours /week	L	2	T	0	P/S	0			Credits	2

COURSE OBJECTIVE:

- To create awareness about natural disasters-factors that cause them-and to foster knowledge about strategies for disaster prevention and management- understanding of fragile Eco-systems and factors that cause global climatic changes.
- Overview of major natural disasters-design & planning solutions for disaster mitigation-organizational and management aspects.

COURSE OUTCOME:

- Ability to understand the cause and effects of natural disasters
- Ability to understand the prevention and design resistant structures
- Ability to understand disaster management

UNIT- I INTRODUCTION TO NATURAL HAZARDS

Understanding the effects of natural calamities such as floods, tropical cyclones, earthquakes, landslides, heat waves , droughts & Tsunami. Climate changes, global sea rise, coastal erosion, environmental degradation, large dams & earth tremors, roads buildings & landslides, urbanization & desertification, cyclone effects on coastal towns.

UNIT- II CASE STUDIES OF NATURAL DISASTERS IN INDIA

Earthquakes at Bhuj, Lattur, etc., Cyclones in coastal Andhra pradesh& Orissa, Landslides in Nilgiris, Himachal etc, Floods in Bangladesh, and Droughts in Rajasthan & Tsunami in Tamil Nadu.

UNIT- III STRATEGIES FOR DISASTER PREVENTION & MITIGATION

Pre disaster, emergency, transition, and recovery. Disaster management plan, Natural crisis management committee [NCMC], State crisis management group [SCMG].

UNIT – IV DESIGN & PLANNING SOLUTIONS

Design guidelines for disaster proof construction at appropriate situations.-Engineering, architectural, landscape & planning solutions for different types of calamities.- Norms, standards and practice procedures for shelter & settlement. Seismic repairs & retrofitting of damaged and undamaged buildings

UNIT – V SEMINAR

Seminar on case studies – disaster management – natural crisis management

SUGGESTED READINGS :

1. Earthquake Resistant Design for Built Environment. Compiled notes by Department of Architecture and Planning, IIT-Roorkee.December 2003.
2. Das P.K, A.R.Ramanathan, An Introduction to Seismic Safety in Architecture, 2007
3. Paul D.K. Singh, Yogendra, Short Term Training Course on Earthquake Resistant Design of Buildings, ADPC, IIT Roorkhe& DMMC, Dehradun, 2002
4. S.Rajagopal - *Problems of housing in cyclone prone areas* - SERC, Vol.2, Chennai, 1980 5.Office of the UN Disaster Relief Co-ordinator - *Disaster prevention and mitigation*, Vol 12, Social and Sociological aspects - UNO, NY, 1986
5. F.C.Cony et.al - *Issue and problems in the prevention of disaster and housing* - A review of experiences from recent disasters - Appropriate reconstruction and training information centre, 1978
6. S.Ramani, *Disaster management - Advanced course on modern trends in housing* - SERC, Vol 2, Chennai, 1980

17ARES836 GREEN BUILDINGS

Objective:

To develop and acquire knowledge about environment and ecosystems, about the use of energy efficient technologies in contemporary buildings – use of natural materials and water conservation technique. Rating of current buildings

UNIT 1

SUSTAINABILTY AND GREEN BUILDING

Understanding of food and energy cycle – Principals of sustainability – Natural ecosystem – Elements of green development – Introduction to green architecture – green building design – benefits – rating systems – LEED, GRIHA,codes -ECBC

UNIT 2

SUSTAINABLE STRATEGIES AND DEVELOPMENT

Sustainable design concepts – strategies – Design principles – Active and passive techniques – land use patterns – site development – site selection – adaptive reuse – existing buildings up gradation

UNIT 3

ENERGY – USAGE AND REGENERATION

Water – consumption – domestic usage – efficiency in usage – low flow plumbing fixtures – water appliances – rain water harvesting – reuse of gray water – energy efficiency – optimizing building envelopes configuration – renewable power- Towards net zero energy building - use of photovoltaic- automation for efficient usage – smart buildings

UNIT 4

BIO DEGRADABLE MATERIALS AND RECYCLING

Concept of embodied energy – performance and life cycles – building materials – selection of sustainable materials – recycling waste – collection and disposal – appropriate technologies – use in landscape.

UNIT 5

ENVIRONMENTAL IMPACT ASSESMENT.

Envirnmental Impact Assesment – Internal frame works & Assessment Tools.

References

1.Anna ray – Jone – Sustainable architecture in japan – The green buildings of Nikken seiki, Wiley – acdemy 2000

2.Architecture and th e environment – bio climatic building design – David Lloyd (Laurence king publishers, London 1998)

3.Sustainable Architecture low tech houses – Charles Broto & Arian Mostedi Pub : joseph Ma Minguet 2002.

4.Energy effiecient buildings in India – Milli majundar. TER publication and ministry of non conventional energy sources,2001

5.Ecology of the sky – Ivor Richards , The Image publishing groups ,2009

SEMESTER-4

16IDT401 Environmental Control - I

Unit – I

Need to study acoustics, methods used for good acoustics. Basic theory: Generation, propagation, transmission, reception of sound: Frequency, wave length and velocity of sound, sound intensity, inverse square law, Decibel scale.

Unit –II

Human ear, Loudness perception, subjective effects, characteristics of sound in speech and music. Speech privacy and annoyance, background noise. Communication in open plans, electronic sound systems, loud speaker"s layout.

Unit – III

Room acoustics: Behavior of sound in enclosed spaces. Ray-diagrams, sound paths, effect of geometry and shapes, sound absorption, sound absorption coefficients, Sabine"s formula, reverberation and resonant panels.

Unit – IV

Acoustic Design process and different types of buildings – auditoriums, concert halls, cinema halls, seminar rooms, lecture halls, classroom and open offices.

Unit – V

Noise reduction, sound isolation, transmission loss. TL for walls, sound leaks in doors, noise reduction between rooms, construction details for noise reduction. Noise reduction and built form. Noise reduction from mechanical equipment. Rubber mounts, vibration isolation guidelines, characteristics of duct system, noise in AC ducts, vibration isolation of pumps and generators.

Unit- VI

Introduction – Lighting and vision, basic units, photometry and measurement. Effects of good lighting, considerations for good lighting, brightness, glare, contrast and diffusion. Economic issues of lighting.

Unit VII

Quality and quantity of different sources of light – daylight, incandescent, fluorescent, halogen, electric gas discharge high discharge, neon, cold cathode, mercury, sodium vapor etc. lighting levels, visual field. Survey of lamps available in the market with cost and technical specifications.

Unit VIII

Day light – advantages, admitting daylight, controlling daylight – multiple glazing, orientation, window treatments, potentials of day lighting as an energy resource.
Artificial lighting - color characteristics of artificial lighting, integration of day lighting with artificial lighting, lighting controls, intelligent building systems for lighting, switches, dimmers.

Unit IX

Planning lighting – general aims, lighting needs, calculation of lighting levels, intensity levels, energy and installation costs and other factors, selection of fixtures, location and placing of fixtures.

Unit X

Lamps and lighting fixtures – Floor, table and desk, wall mounted, ceiling units, built in lighting, miscellaneous types, decorative lighting, spot lighting, task lighting, underwater lighting etc.

Note: Detailed acoustic design and lighting should be done for any one type of building.

References

Poella . L. Leslie, Environmental Acoustics.

Moore J.E. , Design of good acoustics, The architectural press, London, 1961.

Burris, Harold, Acoustics for Architect.

Lord, Peter and Tempelton, Duncan, The Architecture of sound,. ; Designing places of Assembly , Architectural press ltd, London, 1986.

Egan David, Architectural acoustics, Mc-Graw Hill Book company, New york, 1988.

John.F. Pile, Interior Design, 2nd edition, illustrated, H.N.Abrams, 1995.

Wanda jankowski, Lighting : In Architecture and Interior Design, pbc intl, 1995.

Moore Fuller, Concepts and practice of Architectural Day lighting, Van Nostrand Reinhold co., New York, 1985.

David Egan. M. Concepts in Architectural lighting Mcgraw Hill Book company, New York, 1983.

SEMESTER-5

16IDT501 Environmental Control - II

Unit – I

Introduction – Climate and built form interaction. Global climatic factors, elements of climate, impact and issues of climatic balance in traditional and contemporary built environments, issues of ecological balance, implications of climatic forces in nature of spaces and forms. Patterns of organization and elements of built form at individual building.

Unit – II

Thermal comfort and heat flow: Thermal comfort factors, physiological aspects. Body heat balance. Building climatological site analysis, application of comfort diagrams.

Unit-III

Introduction to basic thermal units, theory of heat flow, heat transmission, thermal properties of materials, human heat balance. Physiological comfort, outdoors and indoors, heat flow within buildings, steady state conditions and periodic flow, thermal performance of building elements.

Unit –IV

Sun and Design process – Solar charts, sun angles and shadow angles, orientation for sun, sun control, design of shading devices, radiation, glare.

Unit-V

Solar energy and its technical applications. Climate and material choices, color and texture choices for interior spaces.

References

Koeinsberger, O.H. and others, Manual of Tropical Housing and Building. Orient Longman, Chennai, 2003.

Konya Allan, Design for Hot Climates.

Kukreja. C.P. Tropical Architecture. Tata McGraw Hill Pub. Co. Ltd. New Delhi, 1978.

Markus, T.A and Morris. E.N. Buildings. Climate and Energy, Pitman Pub Ltd., London, 1980.

Olgay and Olgay, Solar Control and Shading Devices.

	Semester I - Elective I	L	T	P	C
17MPNEIC	**Disaster** Management	2	0	8	6

OBJECfIVE: To generate interest in students to understand the causes and consequences of disasters **and its** importance **in planning and managing cities and** towns towards **mitigation and rehabilitation**

UNIT I DISASTER 15

Concepts and proc:esses - Disaster cycle-myths **and** realities- **Disaster-types.causes and consequences -** Impacts **of disasters on** living **things, properties, nature and** community - **Disaster- its importance towards** multi-disciplinary perspective.

UXrrII NATURAL AND MAN•MADt: DISASTERS 30

Disaster and nalur.tlcn,ironmcnt.. Disaster and man-made environment - **Industrial pollution and** health llazards - Industrial pollu1ion ond natural resource darnage. Social vulncrubiliry and damage 10 people and property. Cose studies **related ton:11ural disaslcr and** man.. **made disasters at** the national and **in1cma1ional** levels.

UNIT III DIS.ASTER: PIH'SICAL PLANNING AND RESOURCE MANAGEMENT 30

Physical planning impcrath·s on the development **of villages.IO\Yns and** cities **and regions. Urban** and regional **land use planning and settlement** growth- **Planning standards. building** byelaws, **legal. administrative and** institutionul **.support systems and disaster** management - **Disaster prevention and mitigation- Disaster preparedness and rehabilitation-** Nalional Disaster Monagemool Act 2005.

UNIT IV DISASTER AND TECHNOLOGY 60

Technology-building materials, disaster prone design. planning and management of cities and villages - Communication **systems and technological inputs** towards **disaster** management.

UNIT V DISASTER EDUCATION AND COMMUNITY BUILDING 15

Community awareness **and action- Participatory** management **of community and disasters- NGO role and disaster preparedness and management.** national **and** international **perspectives** - Government-rotes **and various levels in terms of proactive and** reactive **measures** towards managing **disasters- Gender perspectives-women, children, aged, physically** disabled and disaster management. Research writing and article writing to be aP3n of Units I (disaster), JI (natural and man-made disasters). Ill (disaster: physical planning and resource management), IV (disaster and technology) and V **(disaster** educatica **and community building)**

TOTAL: rsn PERIODS

LEARNING OUTCOME: The 1opic scf'thc subjcclsattempt to sensitize 1hcs1udcnts abou11hc ill effect of lhc disasters **as** well **as** the importance **of** preparedness. **Il also** inculcates **the students that** technology **is** well as community **effects ore in1ponan1 10 mitigate disa..stcr.**

Rt;:ft:RENCf:S:

I. Culler L. Susan. ·Environmental Hazards and Risks. Printice Hall of lndoo"'1.Lid. New Delhi.1999.

2. Horst Friedrich. 'E:uthquakc Disaster Management'. Peterlung. London.2005.

3. Journal of Socio Economic Dcvclopmcnl Record Vol.12 No.I Jan-Feb.2005.

4. lan Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulncrabili1y and Rapid Urbanization. Openhouse International, UK.1987.

5. Mary C. Comcrio. 'Disaster Hits Home. New Policy for Urban Housing Recovery', Oxford University Press. London. 2001.

6. Naseem Ahmed. 'Disaster Monagement'. Kilaso Books. New Delhi.2003.

7. Parag Diwan. 'A Manual on Disaster Management'. Pentagon Earth, New Delhi.2007.

8. Satendra. "Sustainable Rural Development for Disaster Mitigation'. Coocepl Publishing Co. I New Delhi.2004.

9. Shyam Divan and Annin Rosencranz. 'Environmental Law and Policy in India. Coses. Malerials and Statutes, Oxford University Press New Delhi.2001.

I0. World Bank. ·Building Safer Cities, World Bank, Geneva.2013.

	Semester III	T	P	C
17MPN301	**Environmental Planning**	3	0	0	3

OBJECTIVE: Environmental planning plays a; 1a1 role in balancing the needs of society by creating and carrying out programs, **policies and regulations** \\>**hich consider the current and future** impact **of human** development **on the natural** environment, **This course** will **expose** you **to** conceptual **tools for** understanding **the** two **principal avenues through which the natural and built environment are managed** - **the rule**–making **procedures of environmental policy and the future** •• **in 1aging of** environmental **planning.**

UNIT I DEVELOPME!>,-CONSEQUENCES OS E!\.V**I**ROSMENT 9

Components **of environmen** **Classific: nion of en, ironmcnt: !11 resources.** **Purpose and objectives in** environmental protection. **planning and management** - **Consequence of** development over **urban and rural** sculcmcnts - Environmental concern sat local. regional and globol levels,

UNIT II ENVIRONMENTAL MANAGEMENTAl'>'0STA;,.DARDS 6

Institutional and legal support in management of environment Environmental policies. and protocols . Global euvironmental **initiatives. Environmental Ind 1 catcn. Concepts a. nd measures** menvironmental **standards** 1!

UNIT III ENVIRONMENTAL **I**i\lPACT ASSESSMENT 9

Ovcevicwof'cnvironmcntal **impact assessment practice in** India, Types. **conceptual approach and phases of EIA** • Impact **idcntification methoddogies** - **Prediction and asscssmcnlof social. cultural and cconornic** environments

UNIT IV ENVIRONMENTAL OECISIO.'iMAKL"G 9

Generation and evaluation of altcrna1ives **Decision melhods** - Mitigatien **and** environmental management **plan** - **Public participation in the process of** environmental **decision making process**

UNIT V ENVIRONMENTAL APPROACH L'IPLA,XNL'IG 12

Environmental concepts- Sustainability **and environmental** carrying **capacity**- **Environmental strategics in land use. transportation. infrastructure planning and management** - **Legislative requirements. public** awareness **and** community **participation**-**Enviroomental** management **options.. Urban and rural housing**

TOTAL: 45 PERIODS

LEARNING OUTCOME: The outcome of this course is to provide the students with professional knowledge, skills **and techniques necessary to** plan, **manage and maintain a balanced. sustainable and productive** environment.

REFERENCES:

I. AseshKumarMaitra,'UrbanEnvironmentinCrisis'. NewAgeIntemotional(P)Limited, Publishers,NewDelhi. 1998.

2.AvijitGupta andMukulG.Asher.'EnvironmentandtheDevelopingWorld',JohnWiley &Sons,NewYork,USA. 1997.

3.CharlesH.Eccleston.'Environmental lmpoctAssessment:AGuidetoBestProfessionalPractices'CRCPress,2011

4. Charles H.Eccleston.NEPAandEn,-ironmentalPlanning;Tools.Techniques.andApproachesforPractitioners.CRC Press.2010

S.JcrzcyA.Filar.AlainHaurie,·**unccnninryandEn,ironmenral DecisionMaking' Springer.20!0**

6. Cbnrlcs H.Eccleston.·EnvironmentalImpact Assessment:AGuidetoBestProfessional Practices'CRCPress.2011

7. Charles H.Eccleston.NEPAondEn,'ironmentolPlanning;Tools.Techniques.andApproachesforPractitioners.CRC Press.2010

8. JcrzoyA.Filar. Alain Haurie,'UncertaintyandEn,;ronmcntol DecisionMaking'Springer.20!0

9.LorryIV.Canter.'Environmental ImpactAssessment".McGraw.Jlill. Inc..NowYork.!996

!0.PannirselvamRand Kanhikeyan, 'En'1ronmcntal Impact Assessment' Sl>GSPublishers,Chcnnui.2005.

!!.Raol'.K.'Sustainable Development', Black"""'Publishers.Massachusetts.USA.2001.

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	Semester III - Elective	L	T	P	C
17MPNE3A	Environmental Design	3	0	0	3

OBJECTIVE:

1. To understand Approach to Environmental Design as applicable to Built Environment and Landscape Development.
2. To study Urban Climatology and Effects of Climate Change on City Planning.

UNIT – 1 EVOLUTION OF ENVIRONMENTAL DESIGN, THEORY AND PRACTICE 15

Design as a determinant of Environmental quality; evolution of Environmental design, theories and practice of design.

UNIT – 2 APPROACH OF ENVIRONMENTAL DESIGN AS APPLICABLE TO BUILT ENVIRONMENT (Part 1) 30

Criteria of Urban Environmental design issues-pedestrian-vehicular conflict, City Centre Environment, Housing areas, dereliction, environmental upgradation programmes; built environment aesthetics of ensemble of buildings, techniques of study of building condition, conservation aspects of built-up areas. Environmental approaches to design and planning of rural settlements, use of alternate technology in design of human settlements.

UNIT – 3 APPROACH OF ENVIRONMENTAL DESIGN AS APPLICABLE TO LANDSCAPE DEVELOPMENT (Part 2) 20

Landscape as an environmental asset, techniques of landscape assessment at different levels, use of landscape design for environmental improvement.

UNIT – 4 URBAN CLIMATOLOGY, ACOUSTICS AND CLIMATE CHANGE 20

Urban climatology, effects of thermal pollution, factors causing heat sink effects, direct radiation, climatic effects on Urban areas, control techniques Urban acoustics:- source of noise, methods of control, design techniques.

UNIT – 5 URBAN CLIMATOLOGY, ACOUSTICS AND CLIMATE CHANGE II 20

Climate Change and City Planning, application of Energy code, Clean Development Mechanism. Research writing and analytical writing to be a part of Units I (Evolution Of Environmental Design, Theory And Practice), II (Approach Of Environmental Design As Applicable To Built Environment (Part 1)), III (Approach Of Environmental Design As Applicable To Landscape Development (Part 2)), IV (Urban Climatology, Acoustics And Climate Change), V (Urban Climatology, Acoustics And Climate Change II)

TOTAL : 105 PERIODS

Outcome: To study Evolution of Environmental Design, Theory and Practice.

REFERENCE BOOKS:

1 Fabio Giudice, Guido La Rosa, Fabio Giudice, Guido La Rosa, AntoninoRisitano Product Design for the Environment: A Life Cycle Approach 2006 Taylor and Francis Group
2 Amos Rapoport Meaning of the Built Environment: A Non-Verbal Communication Approach 1990 Sage Publications, USA
3 Leonard J. Hopper Landscape Architectural Graphic Standards 2007 John Wiley and Sons
4 Mat Santamouris Environmental Design of Urban Buildings: An Integrated Approach 2006 Earthscan UK

	Semester III - Elective	L	T	P	C
17MPNE3B	Environmental Impact Assessment	3	0	0	3

OBJECTIVE:

1. To study Assessment of Impacts on Resources.
2. To Assess the Role of Public Participation in EIA.

UNIT – 1 ROLE, DEFINITION AND SCOPE OF EIA 10

Role of EIA in the Planning and decision making process. Definition and need, evolution and objectives, tasks and scope.

UNIT – 2 METHODS OF EIA 10

Methods of EIA; advantages and limitations.

UNIT – 3 ASSESSMENT OF IMPACTS 10

Assessment of impacts on resources (Including air, water, flora and fauna); assessment of impacts on Land use. Assessment of social and health impacts.

UNIT – 4 ROLE OF PUBLIC PARTICIPATION IN EIA 15

Public Participation in EIA; definition and concepts, objectives, techniques, advantages and limitation, PRA techniques.

UNIT – 5 CASE STUDIES 60

Prepare, Review and analysis of an EIA for eco sensitive area. Research writing and article writing with case studies

TOTAL: 105 PERIODS

Outcome: To study Role, Definition, Scope and Methods of EIA.

REFERENCE BOOKS:

1. Asian Development Bank Environmental Impact Assessment for developing Countries in Asia Vol. I and II. 1997 ADB Publication
2. L.W. Canter Environmental Impact Assessment 2nd Edition 1996 McGraw Hill, New York
3. R.R. Barthwal Environmental Impact Assessment 1998 New Age International Publishers
4. R. Dale Evaluating Development Programme and Project 2nd Edition 2004 Sage Publication
5. A.K. Srivastava Environment Impact Assessment 2003 A.P.H. Publish

	Semester III - Elective	L	T	P	C
17MPNE3C	Environmental legislation, evaluation and practices	3	0	0	3

OBJECTIVE:

1. To familiarize students about various Acts related with Environment Protection.
2. To familiarize students about Ministry of Environment and Forest Guidelines, Notifications and Rules related with Environment Protection and Management.

Contents

UNIT 1 20

- EP Act 1986., Air (Prevention and Control of pollution) Act., Water (Prevention and Control of pollution) Act

UNIT 2 20

- Mines and Mineral Act., Factories Act., Pesticides Act

UNIT 3 20

- Indian Forest Act., Wildlife Act

UNIT 4 20

- Ancient Monuments and Archaeological Sites and Remains Act., Hazardous Waste Management and Handling Rules / Biomedical Rules / Solid Waste

UNIT 5 MANAGEMENT RULES 25

- Environment Tribunal Act
- Climate change Protocols and Conventions
- MOEF Guidelines and Notifications
- Appellate Authority Act
- Other related Notifications
- Research writing and article writing for Units I, 2, 3, 4 and 5

TOTAL : 105 PERIODS

Outcome: To impart knowledge of Legislations related to Environmental Planning, Monitoring, and Impact Assessment.

REFERENCE BOOKS:

1. Shyam Divan, Armin Rosencranz Environmental Law and Policy in India Second edition, 2001 Oxford University Press (India)
2. Jane Holder and Maria Lee Environmental Protection, Law and Policy Second edition, 2007 Cambridge University Press
3. Gadgil M. and Guha R. Ecology and Equity 1995 Oxford, New Delhi
4. Upadhyay S. and Upadhyay V. Book on Environmental Law- Forest Laws, Wildlife Laws and the Environment; Vols. I, II and III,2002 Lexis Nexis- Butterworths India, New Delhi.
5. Choudhuri, S.K. Environmental Legislation in India Latest Edition Oxford QIBH Pub. Co.
6. Bedi, R.S. and Bedi, A.S. Encyclopedia for Environment and Pollution Laws Latest Edition Orient Law House