

Annexure I

1. B. Tech. (Civil Engineering) / M.Tech

1. Curriculum Revision of B. Tech Programme in Civil Engineering (2015-2019) (As per proposed CBCS Scheme)

- (a) In Semester III, CE 205 T (3 1 0) 7 credit Structural Analysis-I is proposed to be **CE 209T (4 1 0) 5 credits Theory of Structures –I**. In addition **CE 209 P (0 0 2) 1 credit** the practical component of Theory of Structures-I is proposed to be incorporated. The detailed syllabus is attached as enclosure (**Annexure_Civil 1**).
- (b) For Semester IV, CE 215 T (3 1 0) 7 Structural Analysis II is proposed to be modified and nomenclatured as **CE 219 T (4 1 0) 5 credits Theory of Structures-II**. The detailed syllabus is attached as enclosure (**Annexure_Civil 2**).
- (c) For Semester V, CE 304 T (3 0 0) 6, Geotechnical Engineering-I, the proposed teaching scheme is CE 304 T (4 0 0) 4. The proposed teaching scheme of CE 304 P (0 0 2) 1 credit would be **CE 304 P (0 0 3) 1.5 credits**.
- (d) For Semester V, the practical component of Urban and Rural Planning, **CE 306 P (0 0 2) 1 credit** is proposed to be **omitted**.
- (e) For Semester VI, CE 313 T (1 0 0) 2 and CE 313P (0 0 4) 2 Computer Aided Design is proposed to be replaced as **CE 316 P (0 1 4) 3 credits, Soft Computing in Civil Engineering**. The detailed syllabus of the same is attached herewith (**Annexure_Civil 3**).
- (f) For Semester V, CE 314 T (3 0 0) 6, Geotechnical Engineering-II, the proposed teaching scheme is CE 314 T (4 0 0) 7. The proposed teaching scheme of CE 314 P (0 0 2) 1 credit would be **CE 314 P (0 0 3) 1.5 credits**.
- (g) For Semester VII, **CE 401 P (0 0 2) 1 credit**, the practical component of Construction Equipments & Methods, is proposed to be **omitted**.
- (h) The individual codes of Department Electives I, II, III and Open Electives (FoET) for Semester VII & VIII are proposed as follows:

Department Elective – I

CE 434 Advanced Foundation
Engineering

CE 451 Advanced Structural Analysis

Department Elective – II

CE 449 Geographical Information
Systems

CE 450 Advanced Concrete
Design

CE 429 Traffic and Transportation Planning

CE 430 Rock Mechanics

CE 432 Docks, Harbour and Airport Engineering

CE 446 Bridge Engineering

CE 437 Energy Efficient Building Design

CE 438 Water Power Engineering

CE 439 Hydraulic Structures

CE 445 Land Management

Department Elective – III

CE 435 Pavement Analysis and Design

CE 431 Advanced Hydrology

CE 440 Retrofitting and Rehabilitation of Structures

CE 452 Pre-stressed Concrete

CE 441 Reinforced earth and Geo Synthetics

CE 447 Ground Improvement Techniques

FOET Level Electives (C2, for VIII semester)
CE 448 Finite Element Method
CE 436 Operation Research Techniques in Civil Engineering
CE 444 Air Quality Monitoring
CE 443 Environmental Impact Assessment and Management

2. M. Tech Programme in Civil Engineering 2015 -2017 (Infrastructure Engineering and Management)

- (a) For Semester I, Elective CE 514 GIS Applications in Infrastructure Engineering has been made more generic and nomenclature as **CE 514 Geographical Information Systems**.
- (b) One additional Elective CE 552 “**Smart Infrastructure & Cities**” has been proposed. Detailed syllabus is provided in **Annexure _Civil 4**.
- (c) The individual codes for Electives I, II, III & IV are proposed as follows:

Department Elective - I

CE 552 Smart Infrastructure and Cities

CE 515 Ground Improvement Techniques

CE 516 Water and Wastewater Treatment

CE 517 Solid Waste & Hazardous Waste Management

CE 518 Urban Water and Storm Water Engineering

CE 519 Project Development Issues in Energy Sector

CE551 Transportation Systems Analysis

CE 520 Traffic and Transport Planning

CE 555 Geo-environment Engineering

CE 557 Civil Engineering Decision
Methods and Tools

Department Elective – III

CE 526 Real Estate Valuation and
Management

CE 559 Value Engineering and
Management

CE 560 Highway & Road Construction

CE 563 Sustainability & Ecological
Design

CE 564 Public Transport and Railway
Operations

CE 565 Urban Infrastructure
Management

CE 566 Software Applications through
Primavera

CE 569 Renewable Energy

CE 573 Enterprise Resource Planning

CE 558 Safety in Infrastructure
Constructions

List of Open Electives (C2) (FOET Level)		
Sr. No.	Elective II	Elective IV
1	CE 514 Geographical Information Systems	CE 568 Finite Element Method
		CE 525 Earthquake Engineering

Courses proposed for PhD (Civil Engineering)

Courses	Justification
CE 721 Advanced Project Management	Would develop insight for carrying out research
CE 722 Building Information Modeling & Cloud Computing	Would develop insight for carrying out research
CE 723 Advanced Concrete Technology	Would develop insight for carrying out research
CE 724 Theory of Elasticity and Plasticity	Would develop insight for carrying out research

2. B. Tech. (Electrical Engineering) / M.Tech

- BOS has reviewed the scheme and detailed syllabus for B. Tech. Electrical and M. Tech. Electrical Power Systems. BOS members suggested following changes.
 - Members have suggested to incorporate the description and detailing for the subjects related to projects and seminars. Accordingly, these have been added into the syllabus.
- As per UGC guideline for the implementation of CBCS, necessary changes have been made.
- **Amendments**

Course code and name: Minor Project (EE 428P)

Sr. No.	Course Content	Addition/ Deletion	Justification
1	A student is required to carry out project work based on the knowledge they have gained so far. The project work may include design, simulation, hardware implementation or study of advance topics. A student is required to submit a report of work done and will defend his/her work carried out.	Addition	To provide the description and detailing For better understanding.

Course code and name: Major Project (EE 434P)

Sr. No.	Course Content	Addition/ Deletion	Justification
1	A student is required to carry out elaborated project work. The project work may include analytical design, fabrication or a simulation of large electrical systems, software design to aid the operation of electrical systems. A student is required to submit a detail report of work done and will defend his/her work carried out.	Addition	To provide the description and detailing For better understanding.

Course code and name: Project (MT 612)

Sr. No.	Course Content	Addition/ Deletion	Justification
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1	The student is required to identify and analyse independently problems in the field of power systems. The project will include preliminary work in the area of interest and will be a base for the Project and Dissertation in the semester IV. The student is required to submit detailed report. It should consist of objectives of study, scope of work, literature review and preliminary work done pertaining to the project undertaken and will defend his/her work carried out.	Addition	To provide the description and detailing for better understanding.
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Course code and name: Project and Dissertation (MT 622)

Sr. No.	Course Content	Addition/ Deletion	Justification
1	Project and Dissertation is a continuation of the work done by the student during Semester III. The student is required to submit the thesis as a partial fulfilment of the M. Tech. degree. The project report should include the work of Project (MT 612) of semester III, which is completed before. In addition, the project report should consist of the detailed study of the project undertaken, concluding remarks and future scope of work, if any.	Addition	To provide the description and detailing for better understanding.

- Two subjects are added in M. Tech to fulfill the requirement of UGC guideline for CBCS (For syllabus ref annexure-Elect_Engg)
 - EE 512 EHV AC and HVDC Transmission (3-0-0)(Department Elective), Semester-I
 - EE 513 Control Motors (3-0-0) (Open Elective-II), Semester-II

3. B. Tech. (Mechanical Engineering and Industrial Engg.)/M. Tech.

The Board of Studies of Mechanical and Industrial Engineering reviewed the question papers of Industrial Engineering and Mechanical Engineering courses of the examinations conducted during the past one year. The question papers were found to be satisfactory. Following suggestion were made by external members to improve the quality of exam papers:

- Statement and validation must be part of question paper.
- Question may be included from public domain examinations (GATE etc.)
- Real time data must be taken in numerical problems
- Question related to quality of fundamentals should be asked

Professor Amit Trivedi apprised the members regarding design curriculum and skill development programme, and outcome based learning.

Revisions in the Course Structure

Operations Research – 1 (IE 303: 3-1-0) is a compulsory course offered during the 5th semester. Looking to the shift in the Operations Research area from manual computation to computer based modeling, the tutorial portion of the course has been replaced by a lab component. Thus, the revised course structure for semester 5 is attached as Annexure-Mechanical. Total credits for the semester remain the same.

Revisions in the Syllabus

1. IE 303T: Operations Research – 1 (Theory)

Detailed syllabus is attached. Topics marked in bold letters have been added.

2. IE 303P: Operations Research – 1 (Practical)

Detailed syllabus is attached. Topics marked in bold letters have been added.

3. IE 309: Operations Research – 2 (Elective)

Detailed syllabus is attached (annexure_Mechanical)

No change was suggested in Mechanical courses a UG and PG level.

4. **B. Tech. (Chemical Engg.).**

Proposed Changes in Teaching Scheme (Batch 2015-16)

Sr. No.	Course Code	Subject	Old Scheme				New proposed scheme				Justification
			L	T	P	C	L	T	P	C	
<u>1</u>	<u>CH 406T</u>	<u>Environment Engineering and Pollution control</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>3</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>Due to overlapping of subject with elective and new addition of topics one tutorial is added.</u>

<u>2</u>	<u>CH 407</u>	<u>Process Plant Safety,</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>3</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>To</u>
		<u>Health and Hygiene</u>									
											<u>numerical part</u>
											<u>in subject one</u>
											<u>tutorial is</u>
											<u>added.</u>

Proposed changes and recommendation in syllabus to FoET for batch 2015-16

	Name of Subject (Code no.)	Modification	Justification
3 rd sem	Fluid Flow Operation (CH 201T)	Unit I: Addition of title – Concepts of fluid static and fluid kinematics - Rearrangement of content	Necessary in order to have the coherence in teaching and elaboration of content
4 th sem	Chemical Process Technology I (Organic) (CH 208T)	Unit I: Addition of title: Concepts of organic chemistry pertaining to various organic chemical products Addition of text book for topics in syllabus	These are the recent text books published and available with the current information in relevance with the
5 th sem	Chemical Reaction Kinetics (CH 301P)	<ol style="list-style-type: none"> 1. A Text book of Organic chemistry by Arun Bahl and B S Bahl; S Chand Publication, 2006 2. Petrochemical Process Technology, I D Mall, Macmillan India Pvt Ltd, 2007 3. A text on Petrochemicals, B K Bhaskararao, Khanna Publishers, 2007 Deletion of Text book title <ol style="list-style-type: none"> 1. D. Venkateswarlu, Chemical Technology III manual of chemical technology, chemical engineering education curriculum development centre, Redefining of lab experiments titles	In order to have coherence with syllabus
5 th sem	Chemical Process Technology II (Inorganic)	Addition of textbook for Unit I: topic Inorganic chemistry <ol style="list-style-type: none"> 1. Shashi Chawla, 'A textbook of engineering chemistry', Dhanpat 	Necessary in order to have the coherence in of content

	(CH303T)	Rai & co., 2007	
6 th sem	Chemical Reactor Design (CH308P)	Redefining of lab experiments titles	In order to have coherence with syllabus
6 th sem	Process Dynamics and Control (CH311P)	Addition of new experiments	In order to have the coherence with teaching and syllabus
8 th sem	Environment Engg and Pollution control (CH 406T)	<ul style="list-style-type: none"> - Addition of the topics to UNIT IV: Case studies in different sectors of chemical industries; Introduction to environmental impact assessment and environment audit - Elective II: Environmental Engg and control in chemical industry (to be removed) (CH022) 	<p>Over lapping of the syllabus topics with the elective CH022</p> <p>In view of cancellation of elective CH022; few important topics needs as a core subject Further, in view of addition of above topics, added 01 hour/week of theory is recommended</p>
8 th sem	Environmental Issues and Control in Chemical Industry (CH022) {Elective II subject}	Drop of the Elective from list of department elective II	Over lapping of the syllabus topics with core subject (CH406T)
8 th sem	Process Plant Safety, Health and Hygiene (CH407)	<ul style="list-style-type: none"> - Rearrangement of syllabus - Addition of topics to UNIT II: Routs of entry of toxicants in Biological organisms, different ways of toxicants elimination from biological organisms, Effects of toxicants on biological organisms, Toxicological studies, Thresh hold Limit Values (This is added in connection with the source models) - Addition of 1 hr of Tutorial - Addition of book Trevor Kletz, "What went wrong?: case history of process 	<p>Necessary in order to have the coherence in teaching and elaboration of content</p> <p>Subject involves design numerical and hence to balance between theory and numerical addition of 1 hour of tutorial is recommended</p>

In view of adopting new CBCS system, out of 3 departmental electives, one departmental elective will be replaced by FoET elective; i.e. CH412 - Nanotechnology will be offered as a FoET elective by department. In that view, two department electives will be floated and list of subjects under Department electives is modified and are as follows:

Department Elective I (offered in 7th sem)

Sr. No.	Department Elective - I	Category wise Credits			
		L	T	P	C
1	CH 411- Food Technology	3	0	0	3
2	CH 413- Pharmaceutical Engineering	3	0	0	3
3	CH 414- Fertilizer Technology	3	0	0	3
4	CH 433- Chem Informatics	3	0	0	3
5	CH 434-Dyes and Intermediates	3	0	0	3

Department Elective II (offered in 8th sem)

Sr No.	Department Elective – II	Category wise Credits			
		L	T	P	C
1	CH 421- Biochemical Engineering	3	0	0	3
2	CH 423- Disaster Management in Chemical Industry	3	0	0	3
3	CH 424- Chemical Industry Practices	3	0	0	3
4	CH 431- Newer Separation Processes	3	0	0	3
5	CH 432- Nuclear Chemical Engineering	3	0	0	3

Department Elective III will be replaced by FoET Elective slot and the subsequent basket of courses.

Ratification and approval of new subjects offered for Ph. D program

Content	Modification (addition/deletion)	Justification

Coursework subjects for PhD	(1) Advanced Separation & Purification Technology (CH704) (Added)	Need for Research
	(2) Advanced Chemical Engineering Thermodynamics, (CH705) (Added)	Need for Research

The coursework for above subjects is given in Annexure I and ANNEXURE II.

FoET Open Elective

As per CBCS (Choice Based Credit System) norms, Chemical Deptt. Offers FoET Elective in 8th semester.

Subject Code – CH 412

Subject Name – Nanotechnology

The course structure is given in ANNEXURE_Chemical

5. Engineering (Physics)

Proposed Changes with Justification

Sr. No.	Original part of existing syllabus	Proposed Changes	Justification	
1	Unit-III Optics	Add following Topics; Interference: Multiple beam interference , Interferometer and its applications Polarization: Optical Modulator, Liquid Crystals	There is no change in number of lectures and adding of this topic will help to strengthen the subject knowledge and its application part.	
2	Unit IV	Add following Topics; Semiconductor Diode LASER, CO ₂ Laser		
3	Unit IV: Nuclear Science and Engineering Basics of Nuclear Physics, activation analysis, Q – Value, Carbon dating, fission and fusion; principle, effect of nuclear radiation on materials, radiation protection and environment.	Remove this topic and add new topic as Modern Physics: Failure of Classical Mechanics, Ultraviolet catastrophe, Photoelectric effect, Compton Effect. Plank's Hypothesis, De Broglie's Dual Nature Principle, Introduction to Quantum Mechanics, Eigen value function, Time dependent and time independent Schrodinger Equation, Tunneling effect.	Not much useful for B. Tech Students	
4	Reference book	Add following books: Concept of Modern Physics, Arthur Beiser, TMH Applied Physics for Engineer, Niraj Mehta, PHI,		

6. Engineering (Chemistry):

The following changes, that had been proposed and accepted by the BOS, were presented with justification and discussed in the FOET meeting for further approval.

(a) Addition/deletion of contents

Semester	Changes (Annexure 1 and 2)
Sem 1	Chemistry of Lubricant - to be included along with Fuel in Unit 1
Chemistry SC101 & SC101P	Chemistry of Advanced Materials - A new unit (Unit 3) is to be introduced which would consist Nanomaterials, Modern-age Catalysts, Polymers and Cement
	Instrumental methods of Chemical Analysis - A new unit (Unit 4) is to be introduced which would consist IR, UV-Vis, Chromatographic techniques, Thermal Analysis, Electroanalytical techniques
	Some new experiments based on the Instrumental methods have been introduced in Practical component (SC101P) (Additional experiments are highlighted in the Annexure)
	The chapters of Polymers and Cements have been reshuffled in the amended units.
	The chapter of Green Chemistry from Unit 3 has been deleted (Reason: Advanced materials are relevant to most of the engineering students, while green chemistry is a specific topic which is more relevant to chemistry students)

(b) Introduction of Electives:

Semester	New Elective (FOET Level) (Annexure 3)
Sem 8	SC 406 - Chemistry of Materials
	SC 407 – Industrial Heterogeneous Catalysis
	SC 408 - Instrumental methods of Chemical Analysis
	SC409 - Nuclear and Radiochemistry
	SC410 – Chemistry of Polymers

(c) Introduction textbook in syllabus:

Semester	Addition of Textbook in syllabus in Engineering Chemistry
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Sem 3 Engineering Chemistry SC201	Skoog, Douglas A, 'Fundamentals of Analytical Chemistry', New Delhi : Cengage Learning
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(a) Introduction of New subject for PhD coursework:

Semester	New subject for PhD coursework
PhD	SC 710T – Environmental Geochemistry

7. Engineering and MSc(Mathematics)

MODIFICATIONS IN PRESENT SYLLABUS

COURSE CODE	UNIT	EXC CONTENT	MODIFICATION (ADDITION/DELETION)	JUSTIFICATION
MA101 T (Sem-I)	I	(i) Successive derivation	Examples for standard forms may be deleted.	Already learnt at class 12.
		(ii) Asymptotes	Examples may be dropped.	Not required later in the course.
	II	Mass, centre of gravity and moment of inertia	May be excluded.	Already learnt in physics course before.
	III	(i) Raabe's test, logarithmic test	May be excluded.	Rest of the tests are sufficient.
		(ii) Beta and gamma functions	Proof of the properties may be excluded.	Studying proof is not important, instead examples may be taught.
MA103 T (Sem-II)	II	Exact differential equations	May be added.	Many students may not have studied in class 12.

	III	Higher order differential equations	Rectilinear motion and simple pendulum may be deleted.	It's not required.
MA201 T (Sem-III)	I	Matrix inversion method	May be added.	It's important.
		Solving system of equations using inverse of a matrix and Cramer's rule	May be dropped.	One method is sufficient.
	III	Parseval's formula and complex form of Fourier series	May be deleted.	Not required.
		Recurrence relation	May be added	Important for solving problems.
	IV	One dimensional heat equation may be taught with respect to Cartesian co-ordinates only.	--	--
MA203 T (SPT, sem-III)	I	Matrix calculus and its applications in solving differential equations	May be dropped.	Studied before.
	III	A sub unit of Fourier series	May be added.	Knowledge is essential.
MA 202 T (Sem-IV)	I	Weddle's rule and Romberg's method	May be excluded.	Other methods are sufficient.
	IV	Partial correlation	May be dropped.	Not needed.

COURSE REDESIGNED

B.Tech. (Sem-V, Industrial Engineering), MA303 T (Applied Statistics)

NEW PROPOSED COURSES

The following Ph.D. papers proposed by the department have been accepted in BOS meeting:

Course code	Course name
MA701 T	Optimization technique
MA702 T	Graph Theory and Algorithms
MA 703 T	MATLAB and fundamentals of image processing
MA704 T	Fundamentals of Operations Research
MA 705 T	Stochastic Optimization Techniques and its Applications
MA 706 T	Optimization Toolbox in MATLAB
MA 202 P	Numerical & Statistical Methods

(For detailed syllabus refer annexure_maths)

8. M. Tech. (Energy systems and Technology)

As per last BOS meeting held on 30th March, 2015 in the Dept. of Solar Energy, PDP, the Chairman, BOS proposes following changes in consensus to other members of the committee:

Content	Modification (addition/deletion)	Justification
New names proposed in the BOS: Prof. P.N. Tekwani, Nirma University (Academics) and Mr. Premal Patwa, Hitachi Hirel, GIDC, External Expert (Industry)	Addition	Due to continuous absence of two external members, Prof. N. Jotwani and Mr. Ramesh Trasi

Since the content of the course Mathematical Technique having code SE 501, which is currently being offered by the Dept. of Solar Energy to the M.Tech. students of Energy Systems and Technology (focused on solar energy) stream is based on mathematics, it is proposed to change the code of the course from SE 501 to MA 502.

The FOET level courses

1. SE 518T Nano structured Materials for Energy Devices is offered in the Odd semesters (1st Semester, PG)
2. SE 515T Photovoltaic Power Plant Engg is offered in the even semesters (2nd Semester, PG)

9. M. Tech. (Nuclear Technology)

M.Tech. (Nuclear Engineering)

Sem	Course	Addition/ Deletion of Course	Justification
I	MA502- Mathematical Techniques	Addition as a credit course	Necessary as a foundation course to train students in the methods of solving PDEs, Nonlinear PDEs, for understanding FVM, FEM, FDM. A good background in Probability Theory and Statistics is needed for Radiation related topics and Monte Carlo method for Neutron Transport. The Mathematical Techniques as such need to be introduced by keeping correlation between theory and applications.
	NE501 - Introduction to Nuclear Engineering		Replaces the "Introduction to Nuclear Technology" course which is majorly non-technical in its contents. Basics of Nuclear Physics, Radiation, Nuclear Fission, Transport Processes of Neutrons and Nuclear Materials are introduced. These are fundamental to understanding Nuclear Reactors and their Applications.
	NE502- Nuclear Thermal Hydraulics - I	Addition as a credit course	Introduces the fundamentals of Heat and Energy Transport Processes as required to understand the more advanced part of Thermal Hydraulics in Nuclear Reactors which is introduced in the second semester.
	NE503T-Radiation Measurement & Radiation Protection		Shifted from Second to First Semester as it is a fundamental subject in Nuclear Engineering. Overlapping topics with Mathematical Techniques have been removed. Radiation shielding has been added.
	NE503P-Radiation Measurement Laboratory		Laboratory course in conjunction with the NE503T course.
	NE5XX -Elective-I	Addition as a credit course	Introduced as per the CBCS norms. Details of 2 Department electives and one Open Elective are included in Annexure.
	SE505 – Renewable Energy and Energy Management	Deleted	Deleted in light of addition of new courses. The course was mostly non-technical in nature.

	NE504 – Radio-Isotope Applications	Deleted	Deleted because this course is more beneficial for geology students and also requires sophisticated lab facilities to be more worthy.
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Sem	Course	Addition/ Deletion of Course	Justification
II	NE506 - Nuclear Reactor Analysis		Shifted from First to Second Semester. Detailed treatment of Nuclear Reactor Processes like Neutron Moderation, Diffusion Kinetics and Control. Basics needed for this is treated in NE501 in first semester.
	NE507T - Nuclear Thermal Hydraulics - II		Shifted from First to Second Semester. Detailed treatment of Heat Conduction, Convection and Safety Analysis of Nuclear Reactors. Basics needed for this is treated in NE502 in first semester.
	NE507P - Thermal Hydraulics Laboratory	Addition	To give practical exposure to Thermal Hydraulic processes.
	NE508 - Nuclear Power Plant Engineering		Changes introduced as per recommendation by external experts of BoS. Details are provided in annexure.
	NE509 - Nuclear Fuel Cycle		Continued from old curriculum with minor changes.
	NE5XX- Elective - II		
	NE505 – Nuclear Plant Operation, Dynamics and Control	Deleted from list of core courses.	Transferred into list of Elective Courses as per recommendation by external experts of BoS.
	NE508 - Nuclear Safety	Deleted from list of core courses.	Transferred into list of Elective Courses as per recommendation by external experts of BoS.

10. M. Tech. (Environmental Engineering and studies)

The BOS for Environmental studies was constituted and a new syllabus with examination scheme is prepared.