

Reference Books:

1. Naraynan K. L., Kannaiah P. ó Engineering Drawing, Scitech.
2. Jolhe D. A. ó Engineering Drawing, Tata McGraw Hill Publication, 2008.

1B8 ENGINEERING GRAPHICS – LAB.

List of Practicals :

Every student will submit a set of at least SIX drawing sheets (from 1 to 7 listed below) and perform at least TWO practical (from 8 to 10 listed below) using CAD software. Examination will consist of viva-voce based on the syllabus.

1. Loci of points of various mechanisms
2. Projection of straight line
3. Projection of plane
4. Orthographic projection
5. Projection of solids
6. Isometric projection/view
7. Free hand sketches of simple machine elements, like :
 - (a) Screw threads ISI profile
 - (b) Types of nuts, bolts, studs, set screws, washers, locking arrangement of nuts & bolts
 - (c) Foundation bolts ó Rag, eye, lewis types
8. Drafting of basic 2D geometrical shapes using CAD software
9. Drafting of basic 3D geometrical shapes using CAD software
10. Drafting of 2D and 3D objects using surface modeling commands

ENGLISH COMMUNICATION SKILLS LABORATORY - 1B5

Teaching Scheme: Practical: 4Hrs. / week

Examination Scheme : Internal Test :25 marks

External Practical examination : 25 marks

Course Outcomes:

- The learning outcome of students will be assessed through assignments, tests and final exams and most importantly through practical performances.
- Through these tests, it would be revealed that students are able to reproduce their understanding of concepts/principles of communication in English language.
- Students can present themselves well in front of large audience on a variety of topics. Moreover they get the knack for structured conversation to make their point of views clear to the listeners.

PRACTICALS:

Exercise 1: Types of communication, barriers to communication, effective communication

Exercise 2: Foundation of language: grammaticality and acceptability, word power, accuracy and appropriateness.

Exercise 3: Assignment on vocabulary building & Writing skill :nature of writing, stages of writing (pre, while and post), qualities of effective writing, what makes writing poor, the what, howand why of writing, drafting, summarizing, letter writing, writing reports.

Exercise 4: Speaking: pronunciation, stress, intonation and pauses, formal and informal expressions, conversation skills, presentation skills, business etiquette.

Exercise 5: Group Discussion- To study about group discussion technique.

Exercise 6: Interview skill- To study about personal interview.

Exercise 7: Planning and Mot- To study how to plan and execute an activity in a group.

Exercise 8: Seminar skill- To study how to conduct and deliver a seminar.

Exercise 9: Conference ó To study how to conduct conference.

Exercise 10: Interpersonal communication- Conduct an activity for social cause.

Exercise 11: Project- Writing class newsletter.

Reference Books:

1. S. Mishra & C. Muralikrishna, óCommunication Skills for Engineersö, Pearson Education.
2. T.M. Farhathullah , óCommunication Skills for Technical Studentsö, Orient Longman.
3. Saran Freeman, óWritten Communication in Englishö, Orient Longman.
4. Raymond Murphy, óEssential English Grammar (Elementary & Intermediate)ö, CUP.
5. Shirley Tailor, óCommunication for Business: A Practical Approachö, Longman Developing .
6. Krishna Mohan &MeeraBanerji, ó Communication Skillsö, Macmillan.
7. R. C. Sharma & Krishna Mohan, óBusiness Correspondence and Report Writingö, Tata McGraw Hill.

Websites:

- <http://www.englishpage.com>
- <http://www.english-4u.de/>
- <http://www.nonstopenglish.com/>
- <http://www.business-english.com>
- <http://www.breakingnewsenglish.com/>
- <http://www.ello.org/>

A Guide to Induction Program

1 Introduction

(Induction Program was discussed and approved for all colleges by AICTE in March 2017. It was discussed and accepted by the Council of IITs for all IITs in August 2016. It was originally proposed by a Committee of IIT Directors and accepted at the meeting of all IIT Directors in March 2016.¹ This guide has been prepared based on the Report of the Committee of IIT Directors and the experience gained through its pilot implementation in July 2016 as accepted by the Council of IITs. Purpose of this document is to help institutions in understanding the spirit of the accepted Induction Program and implementing it.)

Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond.

The graduating student must have knowledge and skills in the area of his study. However, he must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he would understand and fulfill his responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.

There is a mad rush for engineering today, without the student determining for himself his interests and his goals. This is a major factor in the current state of demotivation towards studies that exists among UG students.

The success of gaining admission into a desired institution but failure in getting the desired branch, with peer pressure generating its own problems, leads to a peer environment that is demotivating and corrosive. Start of hostel life without close parental supervision at the same time, further worsens it with also a poor daily routine.

To come out of this situation, a multi-pronged approach is needed. One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them

¹A Committee of IIT Directors was setup in the 152nd Meeting of IIT Directors on 6th September 2015 at IIT Patna, on how to motivate undergraduate students at IITs towards studies, and to develop verbal ability. The Committee submitted its report on 19th January 2016. It was considered at the 153rd Meeting of all IIT Directors at IIT Mandi on 26 March 2016, and the accepted report came out on 31 March 2016. The Induction Program was an important recommendation, and its pilot was implemented by three IITs, namely, IIT(BHU), IIT Mandi and IIT Patna in July 2016. At the 50th meeting of the Council of IITs on 23 August 2016, recommendation on the Induction Program and the report of its pilot implementation were discussed and the program was accepted for all IITs.

work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character.

2 Induction Program :

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days.

We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. 2

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

2 Induction Program as described here borrows from three programs running earlier at different institutions: (1) Foundation Program running at IIT Gandhinagar since July 2011, (2) Human Values course running at IIIT Hyderabad since July 2005, and (3) Counselling Service or mentorship running at several IITs for many decades. Contribution of each one is described next.

(1) IIT Gandhinagar was the first IIT to recognize and implement a special 5-week Foundation Program for the incoming 1st year UG students. It took a bold step that the normal classes would start only after the five week period. It involved activities such as games, art, etc., and also science and other creative workshops and lectures by resource persons from outside.

(2) IIIT Hyderabad was the first one to implement a compulsory course on Human Values. Under it, classes were held by faculty through discussions in small groups of students, rather than in lecture mode. Moreover, faculty from all departments got involved in conducting the group discussions under the course. The content is non-sectarian, and the mode is dialogical rather than sermonising or lecturing. Faculty were trained beforehand, to conduct these discussions and to guide students on issues of life.

(3) Counselling at some of the IITs involves setting up mentor-mentee network under which 1st year students would be divided into small groups, each assigned a senior student as a student guide, and a faculty member as a mentor. Thus, a new student gets connected to a faculty member as well as a senior student, to whom he/she could go to in case of any difficulty whether psychological, financial, academic, or otherwise.

The Induction Program defined here amalgamates all the three into an integrated whole, which leads to its high effectiveness in terms of building physical activity, creativity, bonding, and character. It develops sensitivity towards self and one's relationships, builds awareness about others and society beyond the individual, and also in bonding with their own batch-mates and a senior student besides a faculty member. Scaling up the above amalgamation to an intake batch of 1000 plus students was done at IIT(BHU), Varanasi starting from July 2016.

2.1 Physical Activity :

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field at 6 am for light physical exercise or yoga. There would also be games in the evening or at other suitable times according to the local climate. These would help develop team work. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

2.2 Creative Arts :

Every student would chose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program.

These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into engineering design later.

2.3 Universal Human Values :

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. Need for character building has been underlined earlier. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through do's and don't's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

The teachers must come from all the departments rather than only one department like HSS or from outside of the Institute. Experiments in this direction at IIT(BHU) are noteworthy and one can learn from them.³

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for rest of the semester as a normal course, and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 4-year stay and possibly beyond.

3The Universal Human Values Course is a result of a long series of experiments at educational institutes starting from IIT-Delhi and IIT Kanpur in the 1980s and 1990s as an elective course, NIT Raipur in late 1990s as a compulsory one-week off campus program. The courses at IIT(BHU) which started from July 2014, are taken and developed from two compulsory courses at IIIT Hyderabad first introduced in July 2005.

2.4 Literary

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

2.5 Proficiency Modules

This period can be used to overcome some critical lacunas that students might have, for example, English, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially. We hope that problems arising due to lack of English skills, wherein students start lagging behind or failing in several subjects, for no fault of theirs, would, hopefully, become a thing of the past.

2.6 Lectures by Eminent People

This period can be utilized for lectures by eminent people, say, once a week. It would give the students exposure to people who are socially active or in public life.

2.7 Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

2.8 Familiarization to Dept./Branch & Innovations

The students should be told about different method of study compared to coaching that is needed at IITs. They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

3 Schedule

The activities during the Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The Initial and Closing Phases would be two days each.

3.1 Initial Phase

<i>Time</i>	<i>Activity</i>
Day 0	
<i>Whole day</i>	<i>Students arrive - Hostel allotment. (Preferably do preallotment)</i>
Day 1 <i>09:00 am - 03:00 pm</i>	<i>Academic registration</i>
<i>04:30 pm - 06:00 pm</i>	<i>Orientation</i>
Day 2 <i>09:00 am - 10:00 am</i>	<i>Diagnostic test (for English etc.)</i>
<i>10:15 am - 12:25 pm</i>	<i>Visit to respective depts.</i>
<i>12:30 pm - 01:55 pm</i>	<i>Lunch</i>
<i>02:00 pm - 02:55 pm</i>	<i>Director's address</i>
<i>03:00 pm - 05:00 pm</i>	<i>Interaction with parents</i>
<i>03:30 pm - 05:00 pm</i>	<i>Mentor-mentee groups - Introduction within group. (Same as Universal Human Values groups)</i>

3.2 Regular Phase

After two days is the start of the Regular Phase of induction. With this phase there would be regular program to be followed every day.

3.2.1 Daily Schedule

Some of the activities are on a daily basis, while some others are at specified periods within the Induction Program. We first show a typical daily timetable.

<i>Sessn.</i>	<i>Time</i>	<i>Activity</i>	<i>Remarks</i>
	Day 3 onwards 06:00 am	<i>Wake up call</i>	
<i>I</i>	06:30 am - 07:10 am	Physical activity (mild exercise/yoga)	
	<i>07:15 am - 08:55 am</i>	<i>Bath, Breakfast, etc.</i>	
<i>II</i>	09:00 am - 10:55 am	Creative Arts / Universal Human Values	Half the groups do Creative Arts
<i>III</i>	III 11:00 am - 12:55pm	Universal Human Values / Creative Arts	Complementary alternate
	<i>01:00 pm - 02:25 pm</i>	<i>Lunch</i>	
<i>IV</i>	02:30 pm - 03:55 pm	Afternoon Session	See below.
<i>V</i>	04:00 pm - 05:00 pm	Afternoon Session	See below.
	<i>05:00 pm - 05:25 pm</i>	<i>Break / light tea</i>	
<i>VI</i>	05:30 pm -06:45pm	Games / Special Lectures	
	<i>06:50 pm - 08:25 pm</i>	<i>Rest and Dinner</i>	
<i>VII</i>	08:30pm - 09:25pm	Informal interactions (in hostels)	

Sundays are off. Saturdays have the same schedule as above or have outings.

3.2.2 Afternoon Activities (Non-Daily)

The following five activities are scheduled at different times of the Induction Program, and are not held daily for everyone:

1. Familiarization to Dept./Branch & Innovations
2. Visits to Local Area
3. Lectures by Eminent People
4. Literary
5. Proficiency Modules

Here is the approximate activity schedule for the afternoons (may be changed to suit local needs):

<i>Activity</i>	<i>Session</i>	<i>Remarks</i>
Familiarization with Dept/Branch & Innovations	IV	For 3 days (Day 3 to 5)
Visits to Local Area	IV, V and VI	For3 days-interspersed(e.g.,3 Saturdays)
Lectures by Eminent People	IV	As scheduled - 3-5 lectures
Literary (Play / Book Reading / Lecture)	IV	<i>For 3-5 days</i>
Proficiency Modules	V	Daily, but only for those who need it

3.3 Closing Phase

<i>Time</i>	<i>Activity</i>
Last But One Day 08:30 am - 12 noon	Discussions and finalization of presentation within each group
02:00 am - 05:00 pm	Presentation by each group in front of 4 other groups besides their own (about 100 students)
Last Day Whole day	Examinations (if any). May be expanded to last 2 days, in case needed.

3.4 Follow Up after Closure

A question comes up as to what would be the follow up program after the formal 3-week Induction Program is over? The groups which are formed should function as mentormentee network. A student should feel free to approach his faculty mentor or the student guide, when facing any kind of problem, whether academic or financial or psychological etc. (For every 10 undergraduate first year students, there would be a senior student as a *student guide*, and for every 20 students, there would be a *faculty mentor*.) Such a group should remain for the entire 4-5 year duration of the stay of the student. Therefore, it would be good to have groups with the students as well as teachers from the same department/discipline.

Here we list some important suggestions which have come up and which have been experimented with.

3.4.1 Follow Up after Closure – Same Semester

It is suggested that the groups meet with their faculty mentors once a month, within the semester after the 3-week Induction Program is over. This should be a scheduled meeting shown in the timetable. (The groups are of course free to meet together on their own more often, for the student groups to be invited to their faculty mentors' home for dinner or tea, nature walk, etc.)

3.4.2 Follow Up – Subsequent Semesters

It is extremely important that continuity be maintained in subsequent semesters. It is suggested that at the start of the subsequent semesters (upto fourth semester), three days be set aside for three full days of activities related to follow up to Induction Program. The students be shown inspiring films, do collective art work, and group discussions be conducted. Subsequently, the groups should meet at least once a month.

4 Summary

Engineering institutions were set up to generate well trained manpower in engineering with a feeling of responsibility towards oneself, one's family, and society. The incoming undergraduate students are driven by their parents and society to join engineering without understanding their own interests and talents. As a result, most students fail to link up with the goals of their own institution.

The graduating student must have values as a human being, and knowledge and metaskills related to his/her profession as an engineer and as a citizen. Most students who get demotivated to study engineering or their branch, also lose interest in learning.

The *Induction Program* is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and building of character.

The *Universal Human Values* component, which acts as an anchor, develops awareness and sensitivity, feeling of equality, compassion and oneness, draw attention to society and

4We are aware that there are advantages in mixing the students from different depts. However, in mixing, it is our experience that the continuity of the group together with the faculty mentor breaks down soon after. Therefore, the groups be from the same dept. but hostel wings have the mixed students from different depts. For example, the hostel room allotment should be in alphabetical order irrespective of dept.

nature, and character to follow through. It also makes them reflect on their relationship with their families and extended family in the college (with hostel staff and others). It also connects students with each other and with teachers so that they can share any difficulty they might be facing and seek help.

References:

Motivating UG Students Towards Studies,

Rajeev Sangal, IITBHU Varanasi, Gautam Biswas, IIT Guwahati, Timothy Gonsalves, IIT Mandi, Pushpak Bhattacharya, IIT Patna, (Committee of IIT Directors), 31 March 2016, IIT Directors' Secretariat, IIT Delhi.

Contact:

Prof. Rajeev Sangal

Director, IIT(BHU), Varanasi

(director@iitbhu.ac.in)

18 June 2017

8CE 05: WATER RESOURCES ENGINEERING – II – Lab

TERM WORK: Five problems from the following to be worked out by the students, whenever necessary scale drawing on half empirical size must be drawn:

Practical examination shall consist of viva ó voce.

1. Fixing control levels of Reservoir from given data.
2. Cross section, plan, L-section of Earth dam showing all components;
Details of drainage of downstream casing.
3. Design and Drawing of elementary and practical profile of gravity dam.
4. Design and drawing of diversion weir on permeable foundation.
5. Design and Drawing of ogee spillway with energy dissipaters.
6. Computer Aided design of unlined and lined canal.
7. Drawing of any four canal structure (No design)
8. Technical Field visit.

8CEO2: ENVIRONMENTAL ENGINEERING – II

SECTION –A

Unit-I

Quantity of storm water, DWF, variation of sewage, flow systems of sewerage - separate combined and partially combined, layouts of sewerage system, capacity of sewers design of sewers Laying out of circular sewers-Boning rod and sight rail method, Testing & maintenance of sewers.

Unit-II

Waste water characteristic, sampling of sewage, physical chemical and biological examinations, B.O.D. and C.O.D., B.O.D. equation, problems on B.O.D Pollution due to domestic and industrial waste. Treatment of sewage - purpose of treatment, preliminary treatment, primary treatment and secondary treatment. Flow diagram for conventional sewage treatment plant. Preliminary Treatment:- Screening, Grit chamber, detritus tank. Primary Treatment:- Sedimentation of sewage.

Unit-III

Biological treatment: Trickling filters, low rate & high rate tricking filters, construction details, Re- circulation Modification of trickling filters Activated sludge process - Process description, Methods of aeration, loading rates, Different modified forms of A.S.P.,MLSS & SVI, F/M.

SECTION –B

Unit-IV

Low cost waste treatments - Oxidation ponds, Aerated Lagoon, Treatment and Disposal of sludge - Digestion of sludge, sludge disposal Septic tank, working and design, Disposal of septic tank effluent Disposal of sewage on land and in stream. Effluent standards for disposal on land, into stream and into sewers. MINAS. Self purification capacity of stream

Unit-V

Characteristics of solid waste:- Physical, chemical, biological Analysis.

Collection of solid waste:- Types of collection system and services, frequency of collection, methodology involved in setting up collection bins Disposal of solid wastes:- Different methods, sanitary land fill, composting, incineration.

Unit-VI

Air pollution: Introduction to air pollution, various pollutants their sources and their effects on man and material, prevention or air pollution at sources, introduction to control devices electrostatic precipitator & cyclones only human tolerance level Introduction to EIA and Environmental Audit.

Books Recommended :

- 1) Kshirsagar S.R. : Sewerage and Sewage Treatment, Roorkee Pub House, Roorkee.
- 2) Steel E.W. Steel : Water Supply & Sewerage, McGraw Hill Book Co.
- 3) Birdie G.S. : Water Supply and Sanitary Engineering, Dhanpat Rai & Sonø.
- 4) Garg S.K. : Waste Water Engineering.
- 5) Dr. Bhide A.D., Sunderson B.B. : Solid Waste Management in Developing Countries.
- 6) Rao H.V.N. : Air Pollution.
- 7) Stern, Wohlers, Boobel, Lowry : Fundamentals of Air Pollution, Academic Press, 1973.

6CE02: Environmental Engineering – I

Course Objectives: -

- To make the students conversant with sources and its demand of water
- To understand the basic characteristics of water and its determination
- To expose the students to understand the design of water supply lines
- To provide adequate knowledge about the water treatment processes and its design
- To have adequate knowledge on operation and maintenance of water supply

Course Outcomes: -

- Define and explain the significance of terms and parameters frequently used in water supply engineering.
- Evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
- Basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
- An understanding of water quality criteria and standards, and their relation to public health.

SECTION – A

Unit-I : Quantity Estimation of water: Demand of water. Consumption for various purposes. Fire Demand, Per capita demand. Factors affecting consumption. Fluctuation in demand. Design period, forecasting population.

Sources: Surface sources, ground water sources, Infiltration Galleries, Relative merits of sources, assessment & suitability, selection.

Unit-II :Water quality: Impurities in water, their effects and significance water borne diseases, collection of water samples. Water analysis- physical, chemical and bacteriological. Water quality standards: I.S. & WHO, Flow diagrams and layouts of different water treatment works. Intakes- type, location, requirement & features.

Unit-III: Aeration: Purpose, types of gravity aerators & spray aerators.

Sedimentation: Plain and with coagulation, different coagulants used, dose of coagulant, Jar test, Flocculation, clarifloculator. Design criteria for sedimentation tanks, surface loading, simple problems on design of sedimentation tanks.

SECTION – B

Unit-IV: Filtration: - Rapid sand and slow sand filters, filter media, Rate of filtration, under drainage system and washing process. Control system, Negative head, operating difficulties, pressure filter; Simple design problems on rapid sand filters.

Unit V:Disinfection: - Requirement of good disinfectant, methods of disinfection. Chlorination: Methods, prechlorination, post chlorination. Break point chlorination and super chlorination, forms of chlorine. Use of bleaching powder - Simple problems. Introduction to tertiary treatments-Softening and Defloridation.

Unit-VI: Distribution system: - Types of supply: Continuous, and intermittent. Types of system: Gravity, Pumping and combined gravity and pumping, Layouts of distributions system. Maintenance of distribution system. Equalizing storage, Type of storage reservoirs, capacity. Types of conduits, joints, appurtenances. Pipe laying and testing.

Books Recommended:

1. Steel E. W., “Water Supply and Sewerage”, Mc-Graw Hill.
2. Kshirsagar S. R., “Water Supply Engineering”, Roorkee Pub house, Roorkee.
3. Birde G. S. , “Water Supply and Sanitary Engineering”, Dhanpat Rai and Sons, Delhi.
4. Punmia B. C. “water Supply Engineering”. Laxmi publication.
5. Garg S.K. Water Supply Engineering, Khanna Publishers.

PART-A

SHORT ANSWER PATTERN 25 Marks

1. The Multidisciplinary nature of environmental studies

- . Definition, scope and importance.
- . Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment

- . From Unsustainable to Sustainable development
- . Urban problems related to energy
- . Water conservation, rain water harvesting, watershed management
- . Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- . Environmental ethics : Issues and possible solutions.
- . Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- . Wasteland reclamation.
- . Consumerism and waste products.
- . Environment Protection Act.
- . Air (Prevention and Control of Pollution) Act.
- . Water (Prevention and Control of Pollution) Act.
- . Wildlife Protection Act.
- . Forest Conservation Act.
- . Issues involved in enforcement of environmental legislation.
- . Public awareness. (7 lecture hours)

3. Human Population and the Environment

- . Population growth, variation among nations.
- . Population explosion - Family Welfare Programme.
- . Environment and human health.
- . Human Rights.
- . Value Education.
- . HIV / AIDS.
- . Women and Child Welfare.
- . Role of Information Technology in Environment and human health.
- . Case Studies. (6 lecture hours)

4. Natural resources :

. Renewable and non-renewable resources :

- . Natural resources and associated problems.
 - Forest resources : Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
 - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
 - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- . Role of an individual in conservation of natural resources.
- . Equitable use of resources for sustainable lifestyles.

(8 lecture hours)

5. Ecosystems

- . Concept of an ecosystem.
- . Structure and function of an ecosystem.
- . Producers, consumers and decomposers.
- . Energy flow in the ecosystem.
- . Ecological succession.
- . Food chains, food webs and ecological pyramids.
- . Introduction, types, characteristic features, structure and function of the following ecosystem :-
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lecture hours)

6. Biodiversity and its conservation

- . Introduction - Definition : genetic, species and ecosystem diversity.
- . Biogeographical classification of India.
- . Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- . Biodiversity at global, National and local levels.
- . India as a mega-diversity nation.
- . Hot-spots of biodiversity.

ES-3

- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
 - Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. (8 lecture hours)

7. Environmental Pollution

- Definition
- Causes, effects and control measures of :-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
- Solid Waste Management : Causes, effects and control measures of
 - Role of an individual in prevention of pollution.
 - Pollution case studies.
 - Disaster management : floods, earthquake, cyclone and landslides. (8 lecture hours)

PART-C ESSAY ON FIELD WORK 25 Marks

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems - pond, river, hill slopes, etc. (5 lecture hours)

- (Notes : i) Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
ii) Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
iii) Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

- Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)

ES-4

- Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
- Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p
- Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
- Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publications (TB)
- Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
- Rao M.N. & Datta A.K., 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
- Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
- Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
- Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications (TB)
- Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.
- डॉ. विठ्ठल घारपुरे : पर्यावरणशास्त्र- पिंपळापूरे अॅन्ड कंपनी पब्लीशर्स, नागपूर.(R)
- Dr. Deshpande, A.P.Dr. Chudiwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B.: Environmental Studies, Pimpalpure & Co., Publishers, Nagpur. (R)
- R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 (R)

(M) Magazine
(R) Reference
(TB) Textbook

DIRECTION

No. 31/2011

Date : 10/06/2011

Subject : Schemes of teaching & examinations of III to VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology

Whereas faculty of Engineering & Technology in its meeting held on 6th June, 2011 vide Item No. 39 accepted and recommended schemes of teaching & examinations of III to VIII/X as per Credit Grade System of various branches as per Credit Grade System in the faculty of Engineering & Technology for its implementation from the session 2011-2012 in phase wise manner,

AND

Whereas the schemes of teaching & examinations of VII & VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology were accepted by the Hon'ble Vice-Chancellor u/s Section 14 (7) of M.U. Act, 1994 on behalf on Academic Council on 9th June, 2011,

AND

Whereas this schemes of teaching & examinations of various branches as per Credit Grade System in the faculty of Engineering & Technology are required to be regulated by the Regulation,

AND

Whereas the process of making the Regulation is likely to take some time,

AND

Whereas the schemes of various branches as per Credit Grade System in the faculty of Engineering & Technology are to be implemented from the academic session 2011-2012,

AND

Whereas syllabi of various branches in the faculty of Engineering & Technology are to be sent for printing.

Now, therefore, I, Dr. Mohan K. Khedkar, Vice-Chancellor of Sant Gadge Baba Amravati University in exercise of powers confirmed upon me under sub section (8) of Section 14 of the Maharashtra Universities Act, 1994, hereby direct as under :-

- 1) This Direction shall be called "Schemes of teaching & examinations of III to VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology, Direction, 2011"
- 2) This Direction shall come into force from the date of its issuance.
- 3) Schemes of teaching and examinations of III to VIII/X semesters as per Credit Grade System of the following branches shall be as per respective Appendices appended with this Direction :-

BRANCH

1)	Civil Engineering	A
2)	Mechanical Engineering	B
3)	Production Engineering	C
4)	Electrical Engineering (Electronics & Power)	D
5)	Electrical and Electronics Engineering	E
6)	Electrical Engineering (Electrical & Power)	F
7)	Electrical Engineering	G
8)	Electronics & Telecommunication Engineering	H
9)	Electronics Engineering	I
10)	Instrumentation Engineering	J
11)	Computer Science & Engineering	K
12)	Computer Engineering	L
13)	Architecture	M
14)	Textile Engineering	N
15)	Chemical Engineering	O
16)	Chemical Technology (Polymer) (Plastic) Technology	P
17)	Chemical Technology (Food, Pulp & Paper, Oil & Paint and Petrochemical) Technology	Q
18)	Information Technology	R
19)	Biomedical Engineering	S

Appendix No.

Sd/-

Dr. Mohan K. Khedkar
Vice-Chancellor

8CE 05: WATER RESOURCES ENGINEERING – II – Lab

TERM WORK: Five problems from the following to be worked out by the students, whenever necessary scale drawing on half empirical size must be drawn:

Practical examination shall consist of viva ó voce.

1. Fixing control levels of Reservoir from given data.
2. Cross section, plan, L-section of Earth dam showing all components;
Details of drainage of downstream casing.
3. Design and Drawing of elementary and practical profile of gravity dam.
4. Design and drawing of diversion weir on permeable foundation.
5. Design and Drawing of ogee spillway with energy dissipaters.
6. Computer Aided design of unlined and lined canal.
7. Drawing of any four canal structure (No design)
8. Technical Field visit.

8CEO2: ENVIRONMENTAL ENGINEERING – II

SECTION –A

Unit-I

Quantity of storm water, DWF, variation of sewage, flow systems of sewerage - separate combined and partially combined, layouts of sewerage system, capacity of sewers design of sewers Laying out of circular sewers-Boning rod and sight rail method, Testing & maintenance of sewers.

Unit-II

Waste water characteristic, sampling of sewage, physical chemical and biological examinations, B.O.D. and C.O.D., B.O.D. equation, problems on B.O.D Pollution due to domestic and industrial waste. Treatment of sewage - purpose of treatment, preliminary treatment, primary treatment and secondary treatment. Flow diagram for conventional sewage treatment plant. Preliminary Treatment:- Screening, Grit chamber, detritus tank. Primary Treatment:- Sedimentation of sewage.

Unit-III

Biological treatment: Trickling filters, low rate & high rate tricking filters, construction details, Re- circulation Modification of trickling filters Activated sludge process - Process description, Methods of aeration, loading rates, Different modified forms of A.S.P.,MLSS & SVI, F/M.

SECTION –B

Unit-IV

Low cost waste treatments - Oxidation ponds, Aerated Lagoon, Treatment and Disposal of sludge - Digestion of sludge, sludge disposal Septic tank, working and design, Disposal of septic tank effluent Disposal of sewage on land and in stream. Effluent standards for disposal on land, into stream and into sewers. MINAS. Self purification capacity of stream

Unit-V

Characteristics of solid waste:- Physical, chemical, biological Analysis.

Collection of solid waste:- Types of collection system and services, frequency of collection, methodology involved in setting up collection bins Disposal of solid wastes:- Different methods, sanitary land fill, composting, incineration.

Unit-VI

Air pollution: Introduction to air pollution, various pollutants their sources and their effects on man and material, prevention or air pollution at sources, introduction to control devices electrostatic precipitator & cyclones only human tolerance level Introduction to EIA and Environmental Audit.

Books Recommended :

- 1) Kshirsagar S.R. : Sewerage and Sewage Treatment, Roorkee Pub House, Roorkee.
- 2) Steel E.W. Steel : Water Supply & Sewerage, McGraw Hill Book Co.
- 3) Birdie G.S. : Water Supply and Sanitary Engineering, Dhanpat Rai & Sonø.
- 4) Garg S.K. : Waste Water Engineering.
- 5) Dr. Bhide A.D., Sunderson B.B. : Solid Waste Management in Developing Countries.
- 6) Rao H.V.N. : Air Pollution.
- 7) Stern, Wohlers, Boobel, Lowry : Fundamentals of Air Pollution, Academic Press, 1973.

6CE02: Environmental Engineering – I

Course Objectives: -

- To make the students conversant with sources and its demand of water
- To understand the basic characteristics of water and its determination
- To expose the students to understand the design of water supply lines
- To provide adequate knowledge about the water treatment processes and its design
- To have adequate knowledge on operation and maintenance of water supply

Course Outcomes: -

- Define and explain the significance of terms and parameters frequently used in water supply engineering.
- Evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
- Basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
- An understanding of water quality criteria and standards, and their relation to public health.

SECTION – A

Unit-I : Quantity Estimation of water: Demand of water. Consumption for various purposes. Fire Demand, Per capita demand. Factors affecting consumption. Fluctuation in demand. Design period, forecasting population.

Sources: Surface sources, ground water sources, Infiltration Galleries, Relative merits of sources, assessment & suitability, selection.

Unit-II :Water quality: Impurities in water, their effects and significance water borne diseases, collection of water samples. Water analysis- physical, chemical and bacteriological. Water quality standards: I.S. & WHO, Flow diagrams and layouts of different water treatment works. Intakes- type, location, requirement & features.

Unit-III: Aeration: Purpose, types of gravity aerators & spray aerators.

Sedimentation: Plain and with coagulation, different coagulants used, dose of coagulant, Jar test, Flocculation, clarifloculator. Design criteria for sedimentation tanks, surface loading, simple problems on design of sedimentation tanks.

SECTION – B

Unit-IV: Filtration: - Rapid sand and slow sand filters, filter media, Rate of filtration, under drainage system and washing process. Control system, Negative head, operating difficulties, pressure filter; Simple design problems on rapid sand filters.

Unit V:Disinfection: - Requirement of good disinfectant, methods of disinfection. Chlorination: Methods, prechlorination, post chlorination. Break point chlorination and super chlorination, forms of chlorine. Use of bleaching powder - Simple problems. Introduction to tertiary treatments-Softening and Defloridation.

Unit-VI: Distribution system: - Types of supply: Continuous, and intermittent. Types of system: Gravity, Pumping and combined gravity and pumping, Layouts of distributions system. Maintenance of distribution system. Equalizing storage, Type of storage reservoirs, capacity. Types of conduits, joints, appurtenances. Pipe laying and testing.

Books Recommended:

1. Steel E. W., “Water Supply and Sewerage”, Mc-Graw Hill.
2. Kshirsagar S. R., “Water Supply Engineering”, Roorkee Pub house, Roorkee.
3. Birde G. S. , “Water Supply and Sanitary Engineering”, Dhanpat Rai and Sons, Delhi.
4. Punmia B. C. “water Supply Engineering”. Laxmi publication.
5. Garg S.K. Water Supply Engineering, Khanna Publishers.

PART-A

SHORT ANSWER PATTERN 25 Marks

1. The Multidisciplinary nature of environmental studies

- . Definition, scope and importance.
- . Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment

- . From Unsustainable to Sustainable development
- . Urban problems related to energy
- . Water conservation, rain water harvesting, watershed management
- . Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- . Environmental ethics : Issues and possible solutions.
- . Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- . Wasteland reclamation.
- . Consumerism and waste products.
- . Environment Protection Act.
- . Air (Prevention and Control of Pollution) Act.
- . Water (Prevention and Control of Pollution) Act.
- . Wildlife Protection Act.
- . Forest Conservation Act.
- . Issues involved in enforcement of environmental legislation.
- . Public awareness. (7 lecture hours)

3. Human Population and the Environment

- . Population growth, variation among nations.
- . Population explosion - Family Welfare Programme.
- . Environment and human health.
- . Human Rights.
- . Value Education.
- . HIV / AIDS.
- . Women and Child Welfare.
- . Role of Information Technology in Environment and human health.
- . Case Studies. (6 lecture hours)

4. Natural resources :

. Renewable and non-renewable resources :

- . Natural resources and associated problems.
 - Forest resources : Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
 - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
 - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- . Role of an individual in conservation of natural resources.
- . Equitable use of resources for sustainable lifestyles.

(8 lecture hours)

5. Ecosystems

- . Concept of an ecosystem.
- . Structure and function of an ecosystem.
- . Producers, consumers and decomposers.
- . Energy flow in the ecosystem.
- . Ecological succession.
- . Food chains, food webs and ecological pyramids.
- . Introduction, types, characteristic features, structure and function of the following ecosystem :-
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lecture hours)

6. Biodiversity and its conservation

- . Introduction - Definition : genetic, species and ecosystem diversity.
- . Biogeographical classification of India.
- . Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- . Biodiversity at global, National and local levels.
- . India as a mega-diversity nation.
- . Hot-spots of biodiversity.

ES-3

- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
 - Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. (8 lecture hours)

7. Environmental Pollution

- Definition
- Causes, effects and control measures of :-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
- Solid Waste Management : Causes, effects and control measures of
 - Role of an individual in prevention of pollution.
 - Pollution case studies.
 - Disaster management : floods, earthquake, cyclone and landslides. (8 lecture hours)

PART-C ESSAY ON FIELD WORK 25 Marks

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems - pond, river, hill slopes, etc. (5 lecture hours)

- (Notes : i) Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
ii) Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
iii) Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

- Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

ES-4

- Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
- Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p
- Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
- Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publications (TB)
- Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
- Rao M.N. & Datta A.K., 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
- Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
- Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
- Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications (TB)
- Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.
- डॉ. विठ्ठल घारपुरे : पर्यावरणशास्त्र- पिंपळापूरे अॅन्ड कंपनी पब्लीशर्स, नागपूर.(R)
- Dr. Deshpande, A.P.Dr. Chudiwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B.: Environmental Studies, Pimpalpure & Co., Publishers, Nagpur. (R)
- R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 (R)

(M) Magazine
(R) Reference
(TB) Textbook

DIRECTION

No. 31/2011

Date : 10/06/2011

Subject : Schemes of teaching & examinations of III to VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology

Whereas faculty of Engineering & Technology in its meeting held on 6th June, 2011 vide Item No. 39 accepted and recommended schemes of teaching & examinations of III to VIII/X as per Credit Grade System of various branches as per Credit Grade System in the faculty of Engineering & Technology for its implementation from the session 2011-2012 in phase wise manner,

AND

Whereas the schemes of teaching & examinations of VII & VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology were accepted by the Hon'ble Vice-Chancellor u/s Section 14 (7) of M.U. Act, 1994 on behalf on Academic Council on 9th June, 2011,

AND

Whereas this schemes of teaching & examinations of various branches as per Credit Grade System in the faculty of Engineering & Technology are required to be regulated by the Regulation,

AND

Whereas the process of making the Regulation is likely to take some time,

AND

Whereas the schemes of various branches as per Credit Grade System in the faculty of Engineering & Technology are to be implemented from the academic session 2011-2012,

AND

Whereas syllabi of various branches in the faculty of Engineering & Technology are to be sent for printing.

Now, therefore, I, Dr. Mohan K. Khedkar, Vice-Chancellor of Sant Gadge Baba Amravati University in exercise of powers confirmed upon me under sub section (8) of Section 14 of the Maharashtra Universities Act, 1994, hereby direct as under :-

- 1) This Direction shall be called "Schemes of teaching & examinations of III to VIII/X Semesters as per Credit Grade System of various branches in the faculty of Engineering & Technology, Direction, 2011"
- 2) This Direction shall come into force from the date of its issuance.
- 3) Schemes of teaching and examinations of III to VIII/X semesters as per Credit Grade System of the following branches shall be as per respective Appendices appended with this Direction :-

BRANCH

1)	Civil Engineering	A
2)	Mechanical Engineering	B
3)	Production Engineering	C
4)	Electrical Engineering (Electronics & Power)	D
5)	Electrical and Electronics Engineering	E
6)	Electrical Engineering (Electrical & Power)	F
7)	Electrical Engineering	G
8)	Electronics & Telecommunication Engineering	H
9)	Electronics Engineering	I
10)	Instrumentation Engineering	J
11)	Computer Science & Engineering	K
12)	Computer Engineering	L
13)	Architecture	M
14)	Textile Engineering	N
15)	Chemical Engineering	O
16)	Chemical Technology (Polymer) (Plastic) Technology	P
17)	Chemical Technology (Food, Pulp & Paper, Oil & Paint and Petrochemical) Technology	Q
18)	Information Technology	R
19)	Biomedical Engineering	S


Appendix No.

Sd/-

Dr. Mohan K. Khedkar
Vice-Chancellor

Four Year Degree Course in Bachelor of Engineering
Branch: **Electronics & Telecommunication Engineering**
Semester Pattern (Credit Grade System)

Semester : Third																	
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
													Int.	Ext.			
THEORY																	
01	3ET1	Engineering Mathematics-III	4	1	--	5	5	3	80	20	100	40	--	--	--	--	
02	3ET2	Object Oriented Programming	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
03	3ET3	Electronic Devices and Circuits	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
04	3ET4	Instrumentation and Sensors	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
05	3ET5	Electromagnetic fields	4	1	--	5	5	3	80	20	100	40	--	--	--	--	
06	3ET6	Environmental Science	2	--	--	2	--	--	--	--	--	--	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
07	3ETp7	Object Oriented Programming Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	3ETp8	Electronic Devices and Circuits Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	3ETp9	Skill Development Lab-I (Measurements, Testing & Instrumentation)	2	--	2	4	2	--	--	--	--	--	50	50	100	25(Int.) 25(Ext)	
Total			24	2	6	32	26	--	--	--	500	--	--	--	200	--	
Total															700		


 Head
 Dept. of Elect. & Telecom. Engg.
 P.R.M.I.T&R Bidnera Amravati

Semester : Fourth

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
													Int.	Ext.			
THEORY																	
01	4ET1	Signals and Systems	4	1	--	5	5	3	80	20	100	40	--	--	--	--	
02	4ET2	Network Analysis	4	1	--	5	5	3	80	20	100	40	--	--	--	--	
03	4ET3	Analog Electronics-I	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
04	4ET4	Digital Electronics	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
05	4ET5	Communication Engg.-I	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
06	4ET6	Environmental Science	2	--	--	2	--	3	--	--	--	--	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
07	4ETp7	Analog Electronics-I Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	4ETp8	Digital Electronics Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	4ETp9	Communication Engg.-I Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	4ETp10	Skill Development Lab-II (Software)	2	--	2	4	2	--	--	--	--	--	50	50	100	25(Int.) 25(Ext)	
Total			24	2	8	34	27	--	--	--	500	--	--	--	250	--	
															Total	750	

Head
Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

27. ENVIRONMENTAL STUDIES**Total Marks : 100****PART-A****SHORT ANSWER PATTERN****25 Marks****1. The Multidisciplinary nature of environmental studies**

- . Definition, scope and importance.
- . Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment

- . From Unsustainable to Sustainable development
- . Urban problems related to energy
- . Water conservation, rain water harvesting, watershed management
- . Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- . Environmental ethics : Issues and possible solutions.
- . Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- . Wasteland reclamation.
- . Consumerism and waste products.
- . Environment Protection Act.
- . Air (Prevention and Control of Pollution) Act.
- . Water (Prevention and Control of Pollution) Act.
- . Wildlife Protection Act.
- . Forest Conservation Act.
- . Issues involved in enforcement of environmental legislation.
- . Public awareness.

(7 lecture hours)

3. Human Population and the Environment

- . Population growth, variation among nations.
- . Population explosion - Family Welfare Programme.
- . Environment and human health.
- . Human Rights.
- . Value Education.
- . HIV / AIDS.
- . Women and Child Welfare.
- . Role of Information Technology in Environment and human health.
- . Case Studies.

(6 lecture hours)

Head

Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

PART-B
ESSAY TYPE WITH INBUILT CHOICE **50 Marks**

4. Natural resources :

- **Renewable and non-renewable resources :**
 - Natural resources and associated problems.
 - Forest resources : Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
 - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
 - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
 - Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles.
- (8 lecture hours)

5. Ecosystems

- Concept of an ecosystem.
 - Structure and function of an ecosystem.
 - Producers, consumers and decomposers.
 - Energy flow in the ecosystem.
 - Ecological succession.
 - Food chains, food webs and ecological pyramids.
 - Introduction, types, characteristic features, structure and function of the following ecosystem :-
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
- (6 lecture hours)

6. Biodiversity and its conservation

- Introduction - Definition : genetic, species and ecosystem diversity.
 - Biogeographical classification of India.
 - Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
 - Biodiversity at global, National and local levels.
 - India as a mega-diversity nation.
 - Hot-spots of biodiversity.
 - Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
 - Endangered and endemic species of India.
 - Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.
- (8 lecture hours)

7. Environmental Pollution

- Definition
 - Causes, effects and control measures of :-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
 - Solid Waste Management : Causes, effects and control measures of
 - Role of an individual in prevention of pollution.
 - Pollution case studies.
 - Disaster management : floods, earthquake, cyclone and landslides.
- (8 lecture hours)

PART-C

ESSAY ON FIELD WORK **25 Marks**

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems - pond, river, hill slopes, etc.

(5 lecture hours)

Head
Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

- (Notes : i) Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
 ii) Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
 iii) Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

- 1) Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
- 2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net (R)
- 3) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- 4) Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- 5) Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
- 6) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- 7) Down to Earth, Centre for Science and Environment (R)
- 8) Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.
- 9) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural Histroy Society, Mumbai (R)
- 10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p
- 11) Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
- 12) Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
- 13) Mhaskar A.K., Matter Hazardous, Techno-Science Publications (TB)
- 14) Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
- 15) Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
- 16) Rao M.N. & Datta A.K., 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
- 17) Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
- 18) Survey of the Environment, The Hindu (M)
- 19) Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

- 20) Dr. Deshpande A.P., Dr. Chudiwale A.D., Dr.Joshi P.P. & Dr. Lad A.B. : Environmental Studies, Pimpalapur & Company Pub., Nagpur.
- 21) डॉ. विठ्ठल घारपुरे : पर्यावरणशास्त्र, पिंपळपुरे अॅन्ड कंपनी पब्लिशर्स, नागपुर.
- 22) Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
- 23) Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications (TB)
- 24) Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.

(M) Magazine

(R) Reference

(TB) Textbook

- 25) Environmental Studies : R.Rajgopalan, Oxford Uni. Press, New Delhi.
- 26) Environmental Chemistry and Pollution by Dr.N.W.Ingole, D.M.Dhannadikar, Dr.S.J.Patil, Dasganu Prakashan, Nagpur.


Head
 Dept. of Elects & Telecom. Engg
 P.R.M.I.T & P.B. Badnera Amravati

Department of Electronics and Telecommunication Engineering
B.E. Electronics and Telecommunication Engineering

Semester: III (B.E. Electronics and Telecommunication Engineering)


Sr. No	Course Name	Course Code	Theory / Pract	Teaching	Credits	Examination Scheme								
						Theory				Practical (Laboratory)				
						Duration of Paper (Hr.)	Max. Marks theory Paper	Int. Marks	Total	Min. Passing Marks	Max. Marks Int.	Max. Marks Ext.	Total	Min. Passing Marks
1	Engineering Mathematics-III	3ETC01	T	4	4	3	80	20	100	40	**	**	**	**
2	Electronic Devices & Circuits	3ETC02	T	3	3	3	80	20	100	40	**	**	**	**
3	Digital System Design	3ETC03	T	3	3	3	80	20	100	40	**	**	**	**
4	Electromagnetic Waves	3ETC04	T	3	3	3	80	20	100	40	**	**	**	**
5	Object Oriented Programming (ES)	3ETC05	T	3	3	3	80	20	100	40	**	**	**	**
6	EDC Lab	3ETC06	Pr	2	1	**	**	**	**	40	**	**	**	**
7	Digital System Design Lab	3ETC07	Pr	2	1	**	**	**	**	25	25	50	25	
8	Object Oriented Programming Lab	3ETC08	Pr	2	1	**	**	**	**	25	25	50	25	
9	Electronic Workshop	3ETC09	Pr	2	1	**	**	**	**	25	25	50	25	
10	** Environmental Science(MANDATORY COURSE)	Mandatory Course	T	2	0					25	25	50	25	
TOTAL MARKS = 700									500				200	

Note: **The Examination of Manadatory Subject Envirnomentl Science shall be conducted in IV Semester


Head
Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

Semester: IV (B.E. Electronics and Telecommunication Engineering)														
Sr. No	Course Name	Course Code	Theory / Pract	Teaching	Credits	Examination Scheme								
						Theory				Practical (Laboratory)				
						Duration of Paper (Hr.)	Max. Marks theory Paper	Int. Marks	Total	Min. Passing Marks	Max. Marks Int.	Max. Marks Ext.	Total	Min. Passing Marks
1	Analog and Digital Communication	4ETC01	T	3	3	3	80	20	100	40	**	**	**	**
2	Analog Circuits	4ETC02	T	3	3	3	80	20	100	40	**	**	**	**
3	Network Theory	4ETC03	T	4	4	3	80	20	100	40	**	**	**	**
4	Signals and Systems	4ETC04	T	3	3	3	80	20	100	40	**	**	**	**
5	Values and Ethics (HS)	4ETC05	T	3	3	3	80	20	100	40	**	**	**	**
6	Analog and Digital Communication Lab	4ETC06	Pr	2	1	**	**	**	**	**	25	25	50	25
7	Analog Circuits Lab	4ETC07	Pr	2	1	**	**	**	**	**	25	25	50	25
8	Network Theory Lab	4ETC08	Pr	2	1	**	**	**	**	**	25	25	50	25
9	Signals & Systems Lab	4ETC09	Pr	2	1	**	**	**	**	**	25	25	50	25
10	** Environmental Science (MANDATORY COURSE)	Mandatory Course	T	2	2						25	25	50	25
TOTAL MARKS = 700									500				200	

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester


Head
 Dept. of Elect. & Telecom. Engg.
 P.B. M.I.T.R. B'dnara Amravati

NOTIFICATION

No. 33/2021

Date : 01/04/2021

Subject : Implementation of the Syllabus of the compulsory subject Environmental Studies exclusively for Engineering & Technology Group (Excluding Architecture) in the Faculty of Science & Technology from the session 2020-21 and onwards

It is notified for general information of all concerned that the authorities of the University have accepted to implement the syllabus of the compulsory subject Environmental Studies exclusively for Engineering & Technology Group (Excluding Architecture) in the Faculty of Science & Technology from the session 2020-21 and onwards as per **Appendix 'A'**.

Sd/-
(Dr.H.R.Deshmukh)
I/c Registrar
Sant Gadge Baba Amravati University

Appendix 'A'

Syllabus of the Subject Environmental Studies [Exclusively for Engg. & Technology Group]

Course Title : ENVIORNMENTAL STUDIES

(Total : 100 Marks)

(A) Course Contents :

[80 Marks]

Unit I: (a) The Multidisciplinary nature of environmental studies:

Definition, Principles, Scope and importance, Man and Environment, Need for public awareness.

(b) Natural Resources: Renewable and non renewable resources:

Availability, use, overexploitation and associated environmental problems related to following Natural resource:

- Forest resources:
- Water resources:
- Mineral Resources:
- Food Resources:
- Energy Resources:
- Land Resources:
- Role of individual in conservation of natural resources'

Unit II: Ecosystems :

- Concept and components of an ecosystem.
- Types of ecosystem
- Structure and function of forest and pond ecosystem.
- Energy flow in the ecosystems.
- Food chains, food webs and ecological pyramids.
- Ecological succession: General mechanism

UNIT III : Biodiversity and it's Conservation :

- Introduction, definition and types of biodiversity.
- Bio-geographical classification of India.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT IV: Environmental Pollution :

- Definition, Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution e. Nuclear hazards.
- Solid waste Management: Principles, methods and significance
- Disaster management: Floods, earth quake, cyclone and landslides.

Head

Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

Unit V : Social issues and the Environment :

- From unsustainable to sustainable development
- Urban problems related to energy
- Water conservation: rain water harvesting, water shed management
- Environmental ethics: issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion and nuclear accidents
- Wasteland reclamation
- **Environmental Legislation:** Environment protection Act (1986); Air (prevention and control of pollution) Act (1981-82); Water (prevention and control of pollution) Act (1974); Wildlife protection act (1972); Forest conservation act (1980). Issues involved in enforcement of environmental legislation

Unit VI : Human population and the environment :

- Population growth and variation among nations
- Population explosion- family welfare program
- Environment and human health
- Human rights
- Value education
- HIV / AIDS
- Women and child welfare
- Role of information technology in environment and human health

(B) Field work : Project report / Internal work / Survey

[20 Marks]

- Visit to a local area to document environmental assets - river / forest / grassland / hill / mountain.
- Visit to a local polluted site - urban / rural / industrial / agricultural.
- Study of local plants, insects, birds.
- Study of local ecosystems - pond, lake, river, forest, etc.

Ans
Head

Dept. of Elect. & Telecom. Engg.
P.R.M.I.T&R Badnera Amravati

Recommended Books :

1. Text Book of Environmental studies, Erach Bharucha, UGC .
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd.
3. Ecology and Environment, P. D. Sharma.
4. Ecology, M. P. Arora, Himalaya Publishing House.

Name of Subject (TH): 4ETC05 – Values & Ethics (HS)

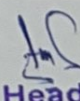
Course Requisite:**Course Objectives:**

1. To create an awareness on Engineering Ethics and Human Values.
2. To understand social responsibility of an engineer.
3. To appreciate ethical dilemma while discharging duties in professional life.

Course Outcomes:

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Subject: Values & Ethics		L
Unit-1	Introduction to Value Education Value Education, Definition, Concept and Need for Value Education, The Content and Process of Value Education, Basic Guidelines for Value Education, Self exploration as a means of Value Education, Happiness and Prosperity as parts of Value Education.	06
Unit-2	Harmony in the Human Being Human Being is more than just the Body, Harmony of the Self ('I') with the Body, Understanding Myself as Co-existence of the Self and the Body, Understanding Needs of the Self and the needs of the Body, Understanding the activities in the Self and the activities in the Body.	06
Unit-3	Harmony in the Family and Society and Harmony in the Nature Family as a basic unit of Human Interaction and Values in Relationships, The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory, Gratitude and Love, Comprehensive Human Goal: The Five Dimensions of Human Endeavour. Harmony in Nature: The Four Orders in Nature, The Holistic Perception of Harmony in Existence.	06
Unit-4	Social Ethics The Basics for Ethical Human Conduct, Defects in Ethical Human Conduct, Holistic Alternative and Universal Order, Universal Human Order and Ethical Conduct, Human Rights violation and Social Disparities.	06
Unit-5	Professional Ethics Value based Life and Profession, Professional Ethics and Right Understanding, Competence in Professional Ethics, Issues in Professional Ethics – The Current Scenario, Vision for Holistic Technologies.	06
Unit-6	Production Systems and Management Models - Typical Case Studies, Strategies for Transition towards Value-based Life and Profession.	06
Total		36



Head

Text Books:

1. A.N.Tripathy, Human Values, New Age International Publishers, 2003
2. Bajpai.B.L., Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted, 2004
3. Bertrand Russell, Human Society in Ethics and Politics

Reference Books:

1. Corliss Lamon! Philosophy of Humanism
2. Gaur.R.R., Sangal.R, Bagaria.G.P., A Foundation Course in Value Education L Excel Books, 2009
3. Gaur.R.R., Sangal.R, Bagaria.G.P., Teacher's Manual, Excel Books, 2009
4. I.C.Sharma, Ethical Philosophy of India, Nagin & Co., Julundhar 8. Mortimer.J.Adler, What Man has Made of Man.
5. R.Subramanian, Professional Ethics, Oxford University Press
6. Text Book for Intermediate Ethics and Human Values, Board of Intermediate Education & Telugu Academy, Hyderabad 11. William LiJly, Introduction to Ethics, Allied Publishers.

**Head**

Dept. of Elect. & Telecom. Engg.
DR. M. T. R. Badnera Amravati

- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
 - Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. (8 lecture hours)

7. Environmental Pollution

- Definition
 - Causes, effects and control measures of :-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
- Solid Waste Management : Causes, effects and control measures of
 - Role of an individual in prevention of pollution.
 - Pollution case studies.
 - Disaster management : floods, earthquake, cyclone and landslides. (8 lecture hours)

PART-C ESSAY ON FIELD WORK 25 Marks

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems - pond, river, hill slopes, etc. (5 lecture hours)

- (Notes : i) Contents of the syllabus mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
- ii) Contents of the syllabus mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
- iii) Contents of the syllabus mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

- 1) Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
- 2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net (R)
- 3) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- 4) Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)

- 5) Cunningham, W.P.Cooper, T.H.Gorhami, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
- 6) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- 7) Down to Earth, Centre for Science and Environment (R)
- 8) Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ. Press. 473p.
- 9) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
- 10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p
- 11) Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
- 12) McKinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
- 13) Mhaskar A.K., Matter Hazardous, Techno-Science Publications (TB)
- 14) Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
- 15) Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
- 16) Rao M.N. & Datta A.K., 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
- 17) Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
- 18) Survey of the Environment, The Hindu (M)
- 19) Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
- 20) Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
- 21) Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications (TB)
- 22) Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.
- 23) डॉ. विठ्ठल धारपुरे : पर्यावरणशास्त्र- पिंपळापूरे अॅन्ड कंपनी पब्लिशर्स, नागपुर (R)
- 24) Dr. Deshpande, A.P.Dr. Chudriwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B. : Environmental Studies, Pimpalapur & Co., Publishers, Nagpur. (R)
- 25) R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 (R)

(M) Magazine
(R) Reference
(TB) Textbook

FOUR YEAR DEGREE COURSE IN BACHELOR OF ENGINEERING
BRANCH : INFORMATION TECHNOLOGY - SEMESTER PATTERN (CREDIT GRADE SYSTEM)
SEMESTER - FIFTH

Appendix - G

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			Lecture	Tutorial	PID	Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
								DURATION OF PAPER (Hr.)	MAX. MARKS THEORY PAPER	MAX. MARKS COLLEGE ASSESMENT	TOTAL	MIN. PASSING MARKS	MAX. MARKS		TOTAL	MIN. PASSING MARKS	
EXTERNAL	INTERNAL																
THEORY																	
01	5IT01	Operating Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
02	5IT02	Digital Integrated Circuits	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
03	5IT03	Computer Architecture & Organisation	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
04	5IT04	Communication Skills	2	--	--	2	2	2	40	10	50	20	--	--	--	--	
05	5FEIT05	Free Elective I*	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	5IT06	Operating Systems-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	5IT07	Digital Integrated Circuits-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	5IT08	Communication Skills-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	5IT09	Computer Lab-III (VC++)	1	--	2	3	2	--	--	--	--	--	25	25	50	25	
TOTAL			18	--	8	26	22				450				200		
													TOTAL		650		

Free Elective I* (i) Introduction to Computer Networks (ii) IT Ethics & Practices

Semester :SIXTH																	
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			Lecture	Tutorial	PID	Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
DURATION OF PAPER (Hr.)	MAX. MARKS THEORY PAPER	MAX. MARKS COLLEGE ASSESMENT						TOTAL	MIN. PASSING MARKS	MAX. MARKS		TOTAL	MIN. PASSING MARKS				
EXTERNAL	INTERNAL																
THEORY																	
01	6IT01	Principles of Management	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
02	6IT02	Database Management Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
03	6IT03	Theory of Computation	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
04	6IT04	Computer Networks	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
05	6FEIT05	Free Elective II*	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	6IT06	Database Management Systems-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	6IT07	Computer Networks-Labs	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	6IT08	Computer Lab-IV (UML)	1	--	2	3	2	--	--	--	--	--	25	25	50	25	
TOTAL			20	--	6	26	23				500				150		
													TOTAL		650		

Free Elective II* (i) E Commerce (ii) Knowledge Management

Note : Students will have to opt the free electives offered from other courses of their College / Institution / University Department

Four Year Degree Course in Bachelor of Engineering Branch: **INFORMATION TECHNOLOGY**
Semester Pattern (Choice Based Credit Grade System)

SEMESTER : THIRD

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
THEORY																	
01	3IT01	Mathematics-III	3	1	--	4	4	3	80	20	100	40	--	--	--	--	
02	3IT02	Discrete Structure & Graph Theory	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	3IT03	Object Oriented Programming	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	3IT04	Assembly Language Programming	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	3IT05	Analog & Digital Electronics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
06	4ES06	**Environmental Studies	2	--	--	2	0	--	--	--	--	--	-	-	-	-	
PRACTICALS / DRAWING / DESIGN																	
07	3IT06	Object Oriented Programming Java lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	3IT07	Assembly Language Programming- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	3IT08	Analog & Digital Electronics- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	3IT09	Comp. Skil Lab.-I	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			17	1	8	26	20	--	--	--	500	--	--	--	200	--	
Total															700		

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

SEMESTER : FOURTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks
													Int.	Ext.		
THEORY																
01	4T01	Computer Organization & Architecture	3	1	4	3	3	3	80	20	100	40	--	--	--	--
02	4IT02	Data Communication & Networking	3	--	--	3	3	3	80	20	100	40	--	--	--	--
03	4IT03	Operating System	3	--	--	3	3	3	80	20	100	40	--	--	--	--
04	4IT04	Data Structures	3	--	--	3	3	3	80	20	100	40	--	--	--	--
05	4IT05	Social Science & Engg. Economics	3	--	--	3	4	3	80	20	100	40	--	--	--	--
06	4ES06	**Environmental Science	2	--	--	2	2	3	80	20	100	40	-	-	-	-
PRACTICALS / DRAWING / DESIGN																
07	4IT06	Data Communication & Networking - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
08	4IT07	Operating System - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
09	4IT08	Data Structures - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
10	4IT09	Comp. Skill Lab.-II	--	--	2	2	1	--	--	--	--	--	25	25	50	25
Total			17	1	8	26	22	--	--	--	500	--	--	--	200	--
Total															700	

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

FOUR YEAR DEGREE COURSE IN BACHELOR OF ENGINEERING
BRANCH : INFORMATION TECHNOLOGY - SEMESTER PATTERN (CREDIT GRADE SYSTEM)
SEMESTER - FIFTH

Appendix - G

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
			Lecture	Tutorial	P/D			DURATION OF PAPER (Hr.)	MAX. MARKS THEORY PAPER	MAX. MARKS COLLEGE ASSESMENT	TOTAL	MIN. PASSING MARKS	MAX. MARKS		TOTAL	MIN. PASSING MARKS
		EXTERNAL	INTERNAL													
THEORY																
01	5IT01	Operating Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--
02	5IT02	Digital Integrated Circuits	4	--	--	4	4	3	80	20	100	40	--	--	--	--
03	5IT03	Computer Architecture & Organisation	4	--	--	4	4	3	80	20	100	40	--	--	--	--
04	5IT04	Communication Skills	2	--	--	2	2	2	40	10	50	20	--	--	--	--
05	5FEIT05	Free Elective I*	3	--	--	3	3	3	80	20	100	40	--	--	--	--
PRACTICALS / DRAWING / DESIGN																
06	5IT06	Operating Systems-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
07	5IT07	Digital Integrated Circuits-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
08	5IT08	Communication Skills-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
09	5IT09	Computer Lab-III (VC++)	1	--	2	3	2	--	--	--	--	--	25	25	50	25
TOTAL			18	--	8	26	22				450				200	
													TOTAL		650	

Free Elective I* (i) Introduction to Computer Networks (ii) IT Ethics & Practices

Semester :SIXTH																
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
			Lecture	Tutorial	P/D			DURATION OF PAPER (Hr.)	MAX. MARKS THEORY PAPER	MAX. MARKS COLLEGE ASSESMENT	TOTAL	MIN. PASSING MARKS	MAX. MARKS		TOTAL	MIN. PASSING MARKS
		EXTERNAL	INTERNAL													
THEORY																
01	6IT01	Principles of Management	4	--	--	4	4	3	80	20	100	40	--	--	--	--
02	6IT02	Database Management Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--
03	6IT03	Theory of Computation	4	--	--	4	4	3	80	20	100	40	--	--	--	--
04	6IT04	Computer Networks	4	--	--	4	4	3	80	20	100	40	--	--	--	--
05	6FEIT05	Free Elective II*	3	--	--	3	3	3	80	20	100	40	--	--	--	--
PRACTICALS / DRAWING / DESIGN																
06	6IT06	Database Management Systems-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
07	6IT07	Computer Networks-Labs	--	--	2	2	1	--	--	--	--	--	25	25	50	25
08	6IT08	Computer Lab-IV (UML)	1	--	2	3	2	--	--	--	--	--	25	25	50	25
TOTAL			20	--	6	26	23				500				150	
													TOTAL		650	

Free Elective II* (i) E Commerce (ii) Knowledge Management

Note : Students will have to opt the free electives offered from other courses of their College / Institution / University Department

Four Year Degree Course in Bachelor of Engineering Branch: **INFORMATION TECHNOLOGY**
Semester Pattern (Choice Based Credit Grade System)

SEMESTER : THIRD

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
THEORY																	
01	3IT01	Mathematics-III	3	1	--	4	4	3	80	20	100	40	--	--	--	--	
02	3IT02	Discrete Structure & Graph Theory	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	3IT03	Object Oriented Programming	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	3IT04	Assembly Language Programming	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	3IT05	Analog & Digital Electronics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
06	4ES06	**Environmental Studies	2	--	--	2	0	--	--	--	--	--	-	-	-	-	
PRACTICALS / DRAWING / DESIGN																	
07	3IT06	Object Oriented Programming Java lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	3IT07	Assembly Language Programming- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	3IT08	Analog & Digital Electronics- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	3IT09	Comp. Skil Lab.-I	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			17	1	8	26	20	--	--	--	500	--	--	--	200	--	
Total															700		

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

SEMESTER : FOURTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks
													Int.	Ext.		
THEORY																
01	4T01	Computer Organization & Architecture	3	1	4	3	3	3	80	20	100	40	--	--	--	--
02	4IT02	Data Communication & Networking	3	--	--	3	3	3	80	20	100	40	--	--	--	--
03	4IT03	Operating System	3	--	--	3	3	3	80	20	100	40	--	--	--	--
04	4IT04	Data Structures	3	--	--	3	3	3	80	20	100	40	--	--	--	--
05	4IT05	Social Science & Engg. Economics	3	--	--	3	4	3	80	20	100	40	--	--	--	--
06	4ES06	**Environmental Science	2	--	--	2	2	3	80	20	100	40	-	-	-	-
PRACTICALS / DRAWING / DESIGN																
07	4IT06	Data Communication & Networking - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
08	4IT07	Operating System - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
09	4IT08	Data Structures - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
10	4IT09	Comp. Skill Lab.-II	--	--	2	2	1	--	--	--	--	--	25	25	50	25
Total			17	1	8	26	22	--	--	--	500	--	--	--	200	--
Total															700	

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

SEMESTER : FIFTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
													Int.	Ext.			
THEORY																	
01	5IT01	Database Management Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
02	5IT02	Theory of Computation	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	5IT03	Software Engineering	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	5IT04	Professional Elective –I (PE-I)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	5IT05	Open Elective – I (OE-I)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	5IT06	Database Management Systems Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	5IT07	Software Engineering Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	5IT08	Professional Elective –I Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	5IT09	Comp. Skill Lab.-III	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			16	0	8	24	20	--	--	--	500	--	--	--	200	--	
															Total	700	

5IT04: PE (I) : (i) Information Security Systems (ii) Data Science & Statistics (iii) Internet of Things

5IT05: OE (I) : (i) Soft Skills & Interpersonal Communication (ii) Computational Biology (iii) Cyber Law & Ethics

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
		Int.	Ext.														
THEORY																	
01	6IT01	Compiler Design	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
02	6IT02	Design & Analysis of Algorithms	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	6IT03	Artificial Intelligence	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	6IT04	Prof. Elective - II (PE-II)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	6IT05	Open Elective - II (OE-II)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	6IT06	Compiler Design Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	6IT07	Design & Analysis of Algorithms - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	6IT08	Prof. Elective - II - Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	6IT09	Comp. Skill Lab.-IV	--	--	2	2	1	--	--	--	--	--	50	--	50	25	
Total			16	0	8	24	20	--	--	--	500	--	--	--	200	--	
														Total		700	
6IT04: PE (II) : (i) Cryptography & Network Security (ii) Big Data Analytics (iii) sensors & Activators																	
6IT05: OE (II) : (i) Economic Policy in India (ii) Human Resource Development & organization (iii) Intellectual Property Right																	

Four Year Degree Course in Bachelor of Engineering Branch: **MECHANICAL ENGINEERING**
Semester Pattern (Choice Based Credit Grade System)

SEMESTER : THIRD

Sr. No.	Subject Code	Subject	TEACHING SCHEME				EXAMINATION SCHEME										
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
												Int.	Ext.				
THEORY																	
01	3ME01	Mathematics-III	3	1	--	4	4	3	80	20	100	40	--	--	--	--	
02	3ME02	Manufacturing Processes	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	3ME03	Mechanics of Materials	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	3ME04	Engineering Thermodynamics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	3ME05	Fluid Mechanics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
06	4ES06	**Environmental Studies	2	--	--	2	--	--	--	--	--	--	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
07	3ME07	Manufacturing Processes- lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	3ME08	Mechanics of Materials- lab .	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	3ME09	Fluid Mechanics- lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	3ME10	Machine Drawing- lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			17	1	8	26	20	--	--	--	500	--	--	--	200	--	
Grand Total															700		

Note: **The Examination of the Subject Environmental Studies shall be conducted in IV Semester.

SEMESTER : FOURTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			100% HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks
													Int.	Ext.		
THEORY																
01	4ME01	Material Science	3	--	--	3	3	3	80	20	100	40	--	--	--	--
02	4ME02	Energy Conversion - I	3	1	--	4	4	3	80	20	100	40	--	--	--	--
03	4ME03	Manufacturing Technology	3	--	--	3	3	3	80	20	100	40	--	--	--	--
04	4ME04	Basic Electrical Drives & Control	3	--	--	3	3	3	80	20	100	40	--	--	--	--
05	4ME05	Hydraulic & Pneumatic Systems	3	--	--	3	3	3	80	20	100	40	--	--	--	--
06	4ES06	**Environmental Studies	2	--	--	2	2	3	80	20	100	40	-	-	-	-
PRACTICALS / DRAWING / DESIGN																
07	4ME07	Material Science-lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
08	4ME08	Manufacturing Technology-lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
09	4ME09	Basic Electrical Drives & Control -lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
10	4ME10	Hydraulic & Pneumatic Systems-lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25
Total			17	1	8	26	22	--	--	--	500	--	--	--	200	--
														Total	700	

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			CREDITS	THEORY				PRACTICAL					
			Lecture	Tutorial	PD		Total HOURS/WEEK	Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks
										Int.	Ext.					
THEORY																
01	6ME01	Design of Machine Elements	3	--	--	3	3	3	80	20	100	40	--	--	--	--
02	6ME02	Dynamics of Machines	3	1	--	4	4	3	80	20	100	40	--	--	--	--
03	6ME03	Control System Engineering	3	--	--	3	3	3	80	20	100	40	--	--	--	--
04	6ME04	Prof. Elective - I	3	--	--	3	3	3	80	20	100	40	--	--	--	--
05	6ME05	Open Elective - II	3	--	--	3	3	3	80	20	100	40	--	--	--	--
PRACTICALS / DRAWING / DESIGN																
06	6ME06	Design of Machine Elements- lab.	--	--	2	2	1	--	--	--	--	25	25	50	25	
07	6ME07	Dynamics of Machines- lab.	--	--	2	2	1	--	--	--	--	25	25	50	25	
08	6ME08	Prof. Elective - I - lab.	--	--	2	2	1	--	--	--	--	25	25	50	25	
09	6ME09	Research Skills - lab.	--	--	2	2	1	--	--	--	--	25	25	50	25	
Total			15	1	8	24	20	--	--	--	500	--	--	200	--	
Grand Total														700		

An Orientation Program of 15 Hours duration / MOOCs on Entrepreneurship Development to be offered during VI Semester.

6ME04: Prof. Elect. (I) : (i) Tool Engineering (ii) Non- Conventional Energy Sources (iii) Computer Aided Design & Simulation

6ME05: Open Elect. (II) [For other Disciplines] : (i) Non- Conventional Energy Sources (ii) Automobile Engineering

Open Elective-II to be opted from the University's faculty of Engineering & Technology offered inter-disciplinary courses or MOOCs courses pertaining to the Engineering Profession.

Unit VI :

Design of Press working Tools:

Types of die construction, function & nomenclature of die components, Cutting Dies- Blanking & Punching,

Forming Dies-Forming, Drawing and Bending etc. Design of Compound, Combination and progressive dies Miscellaneous dies- Horn die, Cam-action die, Rubber & Building die, Suppress die (08 Hours)

Text Books:

1. Tool Design - Cyril Donaldson (Tata Mc-graw Hill)
2. Jigs & Fixtures - P.H.Joshi (Tata Mc-graw Hill)
3. Fundamentals of Metal Cutting & M/c Tools - Juneja (New Age International).
4. Fundamentals of Tool Design - A.Kumar (Dhanpatrai & Sons).
5. A Text book of Production Engineering- P.C.sharma (S.Chand Publication).

REFERENCE BOOKS :

1. Metal Cutting Theory & Cutting Tool Design- Arshinov (Mir Publications)
2. Tool Design - ASTM (ASTME)
3. Jigs and Fixture- Grantt.

6ME04 PROFESSIONAL ELECTIVE –I

(2) NON-CONVENTIONAL ENERGY SOURCES

Course Learning Objectives(CLOs):

1. To study the introduction to renewable and non-renewable resources of energy.
2. To study the radiation transmission through covers & Solar Energy collections.
3. To study the solar energy utilisation and solar energy storage.
4. To study energy from ocean and energy from wind.
5. To study biomass energy resources like biomass and biodiesel.
6. To study photo voltaic cell, fuel cell and geothermal energy.

Course Outcomes (COs):

1. Able to study the concept of renewable and non-renewable sources.
2. Apply the basic concept of solar energy utilization and storage.
3. Apply the concept of energy from ocean and wind.
4. Study the concept of bio-mass energy resources.

UNIT I

- 1. Introduction:-** Global and Indian energy scenario, Need of Renewable energy, need, Renewable and non renewable energy sources, energy and environment,
- 2. Solar Radiation:** Solar constant, Definitions of basic earth-sun angles. Types of Solar radiation, Measurement of solar radiation using Pyrheliometer, Pyranometer and Sunshine Recorder, estimation of solar radiation intensity. (7 hrs)

UNIT II

- 1. Solar thermal systems :** Low temperature applications: solar water heating, space heating, drying. High temperature applications, dish and parabolic collectors. Central tower solar thermal power plants. Solar energy storage and utilization: Methods of storage- mechanical, thermal, electrical storage systems.
- 2. Solar Photovoltaic Systems:** Basic principle of power generation in a PV cell ; Types of photovoltaic cell, Application of PV ; Brief outline of solar PV stand-alone system ; Storage battery and Balance of system. (8 Hrs)

Unit III

Wind Energy Systems: Potential of wind electricity generation in India and current scenario. Wind pattern and wind speed data, Types of turbines, Coefficient of Power, Betz limit. Wind electric generators, Power curve; wind characteristics and site selection; Windfarms for bulk power supply to grid. Application for pumping (7 Hrs.)

Unit IV

Biomass Energy: Biomass: Sources and Characteristics; Wet biogas plants; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems.
Biogas-Types of bio gas plants, factors affecting production rates.
Introduction to biodiesel and ethanol as alternative fuels, (7 Hrs.)

Unit V

Energy from Ocean:

Energy from tides, basic principle of tidal power, single basin and double basin tidal power plants, advantages, limitation and scope of tidal energy.
Ocean Thermal Electric Conversion (OTEC) systems like open cycle, closed cycle, Hybrid cycle, prospects of OTEC in India.
Wave energy and power from wave, wave energy conversion devices, advantages and disadvantages of wave energy (7 Hrs.)

UNIT VI

Fuel Cells: Introduction, working principle of fuel cell, Types of fuel cells, conversion efficiency of fuel cell, application of fuel cells.

Hydrogen Energy: Hydrogen as alternative fuel, Production methods, Hydrogen storage,
Geothermal Energy Resources: Hot Dry Rock system, Vapor dominated, liquid dominated, flash steam, binary fluid and total flow concept of power generation. (8Hrs)

Estimation of means variances and correlation.

Physical Modeling- Concept of System and environment, Principles of modeling, types of models. (8Hrs)

Unit VI: Simulation of Mechanical Systems

Basic Simulation modeling, Role of simulation in model evaluation and studies, advantages of simulation

Simulation of manufacturing Systems: Introduction to Flexible manufacturing systems, Simulation software for manufacturing. (8 Hrs)

Book's Recommended-

Text Books:

- 1) P. N. Rao; CAD/CAM Principles and Applications; McGraw Hills Publications.
- 2) Mikel P. Groover and Emory W. Zimmers: Computer Aided Design and Manufacturing, Prentice hall.
- 3) Ibrahim Zeid: Mastering in CAD- CAM, Tata McGraw Hill Publication.
- 4) Geoffrey Gordon, System Simulation; Prentice Hall

Reference Book:

- 1) Mikell P. Groover: Automation, Production systems & Computer Integrated manufacturing, Prentice Hall.
- 2) Robert E. Shannon; System Simulation: The Art and Science ; Prentice Hall
- 3) J. Schwarzenbach and K.F. Gill Edward Arnold; System Modelling and Control
- 4) P. Radhakrishnan and Subramaniam: CAD/CAM/CIM, wiley Eastern Ltd.

6ME05 OPEN ELECTIVE-II

(1) NON-CONVENTIONAL ENERGY SOURCES

Course Learning Objectives(CLOs):

1. To study the introduction to renewable and non-renewable resources of energy.
2. To study the radiation transmission through covers & Solar Energy collections.
3. To study the solar energy utilisation and solar energy storage.
4. To study energy from ocean and energy from wind.
5. To study biomass energy resources like biomass and biodiesel.
6. To study photo voltaic cell, fuel cell and geothermal energy.

Course Outcomes (COs):

1. Understand concept of renewable and non-renewable sources.
2. Understand the basic concept of radiation transmission through covers and solar energy collections, the basic concept of Solar energy utilization and storage.
3. Demonstrate, concept of energy from ocean and wind.
4. Understand the concept of bio-mass energy resources, concept of direct energy conversion and fuel cell.

UNIT I

1. **Introduction:-** Global and Indian energy scenario, Need of Renewable energy, need, Renewable and non renewable energy sources, energy and environment,
2. **Solar Radiation:** Solar constant, Definitions of basic earth-sun angles. Types of Solar radiation, Measurement of solar radiation using Pyrheliometer, Pyranometer and Sunshine Recorder, estimation of solar radiation intensity. (7 hrs)

UNIT II

Solar thermal systems. Low temperature applications: solar water heating, space heating, drying. High temperature applications, dish and parabolic collectors. Central tower solar thermal power plants.

Solar Photovoltaic Systems: Basic principle of power generation in a PV cell ; Types of photovoltaic cell, Application of PV ; Brief outline of solar PV stand-alone system ; Storage battery and Balance of system. (8 Hrs)

Unit III

Wind Energy Systems: Potential of wind electricity generation in India and current scenario. Types of turbines, Coefficient of Power, Wind electric generators, Power curve; wind characteristics and site selection; Windfarms for bulk power supply to grid. (7 Hrs.)

Unit IV

Biomass Energy: Biomass: Sources and Characteristics; Wet biogas plants ; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems. Introduction to biodiesel and ethanol as alternative fuels, (7 Hrs.)

Unit V

Energy from Ocean: Energy from tides, basic principle of tidal power, single basin and double basin tidal power plants, advantages, limitation and scope of tidal energy.

Ocean Thermal Electric Conversion (OTEC) systems like open cycle, closed cycle, Hybrid cycle, prospects of OTEC in India.

Wave energy and power from wave, wave energy conversion devices, advantages and disadvantages of wave energy (7 Hrs.)

UNIT VI

1. **Fuel Cells :** working principle, types of fuel cells, applications.
2. **Geothermal Energy Resources:** Hot Dry Rock system, Vapor dominated, liquid dominated, flash steam, binary fluid and total flow concept of power generation. (8Hrs)

Books Recommended:

Text Books:-

1. Solar Energy; S.P. Sukhatme; TMH
2. Non-Conventional Energy Sources; G.D. Rai; Khanna Publications

Practical Examination:- The practical examination shall consist of oral on the termwork and syllabus.

6ME08 PROFESSIONAL ELECTIVE -I – LAB
(3) COMPUTER AIDED DESIGN & SIMULATION

Course Learning Objectives(CLOs):

1. To understand fundamentals of CAD.
2. To study the solid modeling techniques.
3. To study the geometric transformation techniques.
4. To demonstrate Simulation of Mechanical Systems.

Course Outcomes (COs):

1. Understand the concept of CAD.
2. Apply knowledge using CAD modeling for component design
3. Apply the knowledge of geometric transformation.
4. Understand the Mechanical & Manufacturing simulation systems.

Practicals:-

Any six practicals from the list should be performed.

1. Creation of 2D drawing (Sketching Module) of any mechanical machine component using any modeling/drawing software.
2. Creation of isometric view from given orthographic view of any mechanical machine part using any modeling software.
3. Creation of 3D drawing of any mechanical machine part using any modeling software.
4. Creation of assembly of Knuckle joint/ Cotter joint using any modeling software.
5. Creation of sheet metal component using any modeling software.
6. Simulation of Four bar chain mechanism using any modeling software.
7. Simulation of Slider crank chain mechanism using any modeling software.

Practical Examination:- The practical examination shall consist of oral on the termwork and syllabus.

6ME09 RESEARCH SKILLS – LAB

Course learning objective:

1. Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
2. Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
3. Use effectively oral, written and visual communication.
4. Identify, analyze, and solve problems creatively through sustained critical investigation.
5. Integrate information from multiple sources.
6. Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.

7. Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.

Course Outcome:

1. Demonstrate a sound technical knowledge of their selected research topic.
2. Undertake problem identification, formulation and solution.
3. Design engineering solutions to complex problems utilizing a systems approach.
4. Conduct an engineering research.
5. Demonstrate the knowledge, skills and attitudes of a professional engineer.

Students will have to perform any one task and prepare a report on it; from the following list

1. A mini project involving mechanisms/ electromechanical systems/
2. CAD modeling/ simulation of any thermal, hydraulic or mechanical system.
3. IoT based system for any domestic/ rural/ agricultural/ industrial application
4. A system using non- conventional energy source
5. Market research for launching a new product.
6. Study of any Small Scale Industry.
7. Any other innovative concept for promoting research and innovation among students.

***Practical Examination:-** The practical examination shall consist of oral based on the task and the report.

will be shown by the grade. The students getting 'D' grade fails in the paper.

Scheme of Examination of Dissertation

Assessment of papers M.B.A. 307 & M.B.A.407 i.e. Dissertation shall be done by internal and external examiners out of 100 marks distributed as 65 marks for dissertation and 35 marks for viva voce. The viva shall be conducted both by internal and external examiners

** Marks obtained in internal assessment papers will be converted in grades as per Table No. 1

The student getting 'D' grade will be declared as 'Fail' in the Dissertation.

17. A student appearing for M.B.A.Semester III & IV Examination will have to pay an additional fee of Rs.500/- for Dissertation in addition to usual Examination fees.
19. Examinees successful at the Semester-I, II & III Examination shall be entitled to receive a Certificate signed by the Registrar, and those successful at the Semester-IV Examination shall on payment of the prescribed fees, receive a Degree in the prescribed form signed by the Vice-Chancellor.

Ashish
HEAD
 Department of Management Studies
 P.R.M.I.T. & R. Badnera

Appendix-A Master of Business Administration Course Semester-I

Subject Code	Name of Subject	Hrs/ Week	Credits	Examination Scheme						
				Duration of Exam Hours	External Max. Pass Marks	External Min. Pass Marks	Internal Max. Pass Marks	Internal Min. Pass Marks	Total Max. Mark	Min. Agg. Mark
MBA/101	Principles And Practice of Management	3	4	3	70	35	30	15	100	350
MBA/102	Managerial Economics	3	4	3	70	35	30	15	100	
MBA/103	Managerial Skill Development	3	4	3	70	35	30	15	100	
MBA/104	Accounting for Managers	3	4	3	70	35	30	15	100	
MBA/105	Organisation Behaviour and Effectiveness	3	4	3	70	35	30	15	100	
MBA/106	Business Ethics	3	4	3	70	35	30	15	100	
MBA/107	Management Information System	3	4	3	70	35	30	15	100	
MBA/108	Quantitative Methods	3	4	—	—	—	Internal Assessment Paper			
Total		24	32						700	350

Appendix-B Master of Business Administration Course Semester-II

Subject Code	Name of Subject	Hrs/ Week	Credits	Examination Scheme						
				Duration of Exam Hours	External Max. Pass Marks	External Min. Pass Marks	Internal Max. Pass Marks	Internal Min. Pass Marks	Total Max. Mark	Min. Agg. Mark
MBA/201	Business Environment	3	4	3	70	35	30	15	100	350
MBA/202	Research Methodology	3	4	3	70	35	30	15	100	
MBA/203	Human Resources Management	3	4	3	70	35	30	15	100	
MBA/204	Financial Management	3	4	3	70	35	30	15	100	
MBA/205	Marketing Management	3	4	3	70	35	30	15	100	
MBA/206	Production and Operations Management	3	4	3	70	35	30	15	100	
MBA/207	Logistics Management	3	4	3	70	35	30	15	100	
MBA/208	Management Science	3	4	—	—	—	Internal Assessment Paper			
Total		24	32						700	350

Appendix-C
Semester-III

Subject Code	Name of Subject	Hrs/Week	Credits	Examination Scheme						Total Max Mark	Min. Agg. Mark
				Duration of Exam Hours	External		Internal		Total		
					Max. Marks	Min. Pass Marks	Max. Marks	Min. Pass Marks			
MBA/301	Business Law	3	4	3	70	35	30	15	100		
MBA/3101/F	Indian Financial System	3	4	3	70	35	30	15	100		
MBA/3102/F	Banking System	3	4	3	70	35	30	15	100		
MBA/3103/F	Working Capital Management	3	4	3	70	35	30	15	100		
MBA/3104/F	International Financial Management	3	4	3	70	35	30	15	100		
MBA/3105/F	Investment Science	3	4	3	70	35	30	15	100		
MBA/3106/F	Risk Management	3	4	3	70	35	30	15	100		
MBA/3201/M	International Business Strategy	3	4	3	70	35	30	15	100		
MBA/3202/M	Sales & Distribution Management	3	4	3	70	35	30	15	100		
MBA/3203/M	Consumer Behavior	3	4	3	70	35	30	15	100		
MBA/3204/M	Advertising Management	3	4	3	70	35	30	15	100		
MBA/3205/M	Brand Management	3	4	3	70	35	30	15	100		
MBA/3206/M	Agriculture Marketing	3	4	3	70	35	30	15	100		
MBA/3301/H	Management of Industrial Relations	3	4	3	70	35	30	15	100	350	
MBA/3302/H	Human Relations & Legal Framework	3	4	3	70	35	30	15	100		
MBA/3303/H	Compensation Management	3	4	3	70	35	30	15	100		
MBA/3304/H	Human Resource Development	3	4	3	70	35	30	15	100		
MBA/3305/H	Management of Training & Development	3	4	3	70	35	30	15	100		
MBA/3306/H	Performance Management	3	4	3	70	35	30	15	100		
MBA/3401/P	Purchasing And Materials Management	3	4	3	70	35	30	15	100		
MBA/3402/P	Production Planning And Control	3	4	3	70	35	30	15	100		
MBA/3403/P	Ergonomics	3	4	3	70	35	30	15	100		
MBA/3404/P	World Class Manufacturing	3	4	3	70	35	30	15	100		
MBA/3405/P	Principles and Practices of Safety Management	3	4	3	70	35	30	15	100		
MBA/3406/P	Costing for Production	3	4	3	70	35	30	15	100		
MBA/307	Dissertation	3	4	—	—	—	—	—	Internal Assessment	700	
Total		24	32						700	350	

Asst. HEAD

Department of Management Studies
P.R.M.I.T. & R. Badnera

Appendix-D
Semester-IV

Subject Code	Name of Subject	Hrs/Week	Credits	Examination Scheme						Total Max Mark	Min. Agg. Mark
				Duration of Exam Hours	External		Internal		Total		
					Max. Marks	Min. Pass Marks	Max. Marks	Min. Pass Marks			
MBA/401	Strategic Management	3	4	3	70	35	30	15	100		
MBA/4101/CGF	Financial Decision Analysis	3	4	3	70	35	30	15	100		
MBA/4102/CGF	Security Analysis And Portfolio Management	3	4	3	70	35	30	15	100		
MBA/4103/CGF	Financial Derivatives	3	4	3	70	35	30	15	100		
MBA/4104/CGF	Management Of Financial Services	3	4	3	70	35	30	15	100		
MBA/4105/CGF	Foreign Exchange Market	3	4	3	70	35	30	15	100		
MBA/4106/CGF	Insurance Management	3	4	3	70	35	30	15	100		
MBA/4201/SM	Sales & Promotion Management	3	4	3	70	35	30	15	100		
MBA/4202/SM	Marketing Of Services	3	4	3	70	35	30	15	100		
MBA/4203/SM	Marketing Of Social Services	3	4	3	70	35	30	15	100		
MBA/4204/SM	Retail Marketing	3	4	3	70	35	30	15	100		
MBA/4205/SM	Rural Marketing	3	4	3	70	35	30	15	100		
MBA/4206/SM	International Marketing	3	4	3	70	35	30	15	100		
MBA/4401/OB	Human Behavior At Work Place	3	4	3	70	35	30	15	100	350	
MBA/4402/OB	Organization Development	3	4	3	70	35	30	15	100		
MBA/4403/OB	Management Of Group Process	3	4	3	70	35	30	15	100		
MBA/4404/OB	Corporate Leadership Management	3	4	3	70	35	30	15	100		
MBA/4405/OB	Knowledge Management	3	4	3	70	35	30	15	100		
MBA/4406/OB	International HRM	3	4	3	70	35	30	15	100		
MBA/4401/OM	Service Operations Management	3	4	3	70	35	30	15	100		
MBA/4402/OM	Applied Operations Research	3	4	3	70	35	30	15	100		
MBA/4403/OM	Transportation Management	3	4	3	70	35	30	15	100		
MBA/4404/OM	Total Quality Management	3	4	3	70	35	30	15	100		
MBA/4405/OM	Industrial Health And Disaster Management	3	4	3	70	35	30	15	100		
MBA/4406/OM	Project Management	3	4	3	70	35	30	15	100		
MBA/407	Dissertation	3	4	3	—	—	—	—	Internal Assessment	700	
Total		24	32						700	350	

Specialization:-

A candidate can offer any one specialization from amongst the available electives for Sem III given in Appendix 'C' for Semester-III.

A candidate can offer any one specialization from amongst the available electives for Sem IV given in Appendix 'D' for Semester-IV.

The Specialization Codes and Titles are tabulated below

Sr. No.	Semester	Specialization Code	Title of pecialization
1	III	F	Financial Management
2		M	Marketing Management
3		H	Human Resource Management
4		P	Production Management
5	IV	CGF	Corporate & Global Finance
6		SM	Services Marketing
7		OB	Organizational Behavior
8		OM	Operations Management

Sd/-

Amravati.
Date:24/5/2011

(Dr. M.K.Khedkar)
Vice-Chancellor

DIRECTION

Date : 6/6/2012

No. 24/2012

Subject: **Corrigendum to Direction No. 26 of 2011 in respect of Examinations leading to the Degree of Master of Business Administration (M.B.A.) (Bi-Annual pattern) (Two year course).**

Whereas, Direction No. 26 of 2011 in respect of Examinations leading to the Degree of Master of Business Administration (M.B.A.) (Bi-Annual pattern) (Two year course) is in existence in the University.

AND

Whereas, the Academic Council in its meeting held on 5/5/2012 vide Item No.74 (A) has resolved to accept the revised tables

providing grade, percentage of marks and grade points and class/division for M.B.A. examinations.

AND

Whereas, the Academic Council in its meeting held on 5/5/2012 vide Item No.74 (B) has resolved to accept the corrections in subject code of MBA/307, MBA/4401/OB, 4402/OB, 4403/OB, 4404/OB, 4405/OB, MBA/4406/OB, and MBA/407, in the scheme of examinations of M.B.A. Semester-III & IV respectively.

AND

Whereas, the Academic Council in its meeting held on 5/5/2012 has resolved to refer the matter to the Ordinance Committee to make amendments in the respective Ordinance/Regulation.

AND

Whereas, the revised scheme for providing Grade and Grade points is to be implemented from the academic session 2011-2012.

AND

Whereas, the revised scheme of examinations for M.B.A. Semester-III & IV is to be implemented from the academic session 2012-13.

AND

Whereas, Hon'ble Vice Chancellor has accepted the scheme of examination and syllabi of additional electives namely Pharmaceutical Management, Sports Management, and Health Care Management of Semester-III & IV of M.B.A. course on behalf of Faculty of Commerce and Academic Council under sub section (7) of section 14 of the Maharashtra Universities Act, 1994 as recommended by the Board of Studies in Business Management, which is to be implemented from the academic session 2012-2013.

AND

Whereas, the matter for changing the scheme of examinations is required to be regulated by the Regulation, and making amendment in respective Regulation is time consuming process.

AND

Whereas, the scheme of examination along with syllabi of M.B.A. Semester-III&IV is to be made available for the academic session 2012-2013.

Now, therefore, I, Dr. M.K. Khedkar, Vice-Chancellor, Sant Gadge Baba Amravati University, Amravati in exercise of the powers conferred upon me under sub section (8) of section 14 of the Maharashtra Universities Act, 1994, do hereby direct as under-

AD

- 1) This Direction may be called "Corrigendum to Direction No. 26 of 2011 in respect of Examinations leading to the Degree of Master of Business Administration (M.B.A.) (Bi-Annual pattern) (Two year course)".
- 2) This direction shall come into force from the date of its issuance.
- 3) The following corrections be made in Direction No. 26 of 2011 for rectifying the Direction which are to be implemented from the academic session 2011-12 as follows-

"The present tables i.e. Table No.1 and Table No.2 appearing under Para 11 of Direction No. 26 of 2011 be substituted by the tables as given in Appendix-A.

- 4) The following new optional subjects along with scheme of teaching, credit, and examination be added under the subject code MBA/3406/P in the scheme of examination of M.B.A. Semester-III under the Appendix-C which was appended with the Direction No. 26 of 2011, which is to be implemented from the examination of Winter-2012.

Subject Code	Name of Subject	Hrs/ Week	Credits	Examination Scheme					
				Duration of Exam Hours	External		Internal		Total Max Marks
					Max. Marks	Min. Pass Marks	Max. Marks	Min. Pass Marks	
MBA/3501/PH	Brand Promotion & Marketing in Pharmaceutical Industry	3	4	3	70	35	30	15	100
MBA/3502/PH	Customer Behaviour in Pharmaceutical Industry	3	4	3	70	35	30	15	100
MBA/3503/PH	Production Management in Pharmaceutical Industry	3	4	3	70	35	30	15	100
MBA/3504/PH	Material Management in Pharmaceutical Industry	3	4	3	70	35	30	15	100
MBA/3505/PH	Sales & Distribution Management in Pharmaceutical Industry	3	4	3	70	35	30	15	100
MBA/3506/PH	Pharmaceutical Regulatory Environment	3	4	3	70	35	30	15	100
MBA/3601/SP	Fundamentals of Management of Sports	3	4	3	70	35	30	15	100
MBA/3602/SP	Human Resource Management for Sports	3	4	3	70	35	30	15	100
MBA/3603/SP	Sports Marketing	3	4	3	70	35	30	15	100
MBA/3604/SP	Financial Management And Economics for Sports	3	4	3	70	35	30	15	100
MBA/3605/SP	Sports Facilities Management	3	4	3	70	35	30	15	100
MBA/3606/SP	Sports Media Management	3	4	3	70	35	30	15	100

- 5) The subject code of MBA/307 in the scheme of examination of M.B.A. Semester -III under the Appendix-C which was appended with the Direction No. 26 of 2011 be substituted by the word & figure MBA/308.
- 6) The subject code MBA/4401/OB, 4402/OB, 4403/OB, 4404/OB, 4405/OB, MBA/4406/OB in the scheme of examination of M.B.A. Semester-IV under the Appendix-D which was appended with the Direction No. 26 of 2011 be substituted by the words & figures MBA/4301/OB, 4302/OB, 4303/OB, 4304/OB, 4305/OB, MBA/4306/OB respectively.
- 7) The following new optional subjects along with scheme of teaching, credit, and examination be added under the subject code MBA/4406/OM in the scheme of examination of M.B.A. Semester-IV under the Appendix-D which was appended with the Direction No. 26 of 2011, which is to be implemented from the examination of Summer-2013.

Subject Code	Name of Subject	Hrs/ Week	Credits	Examination Scheme					
				Duration of Exam Hours	External		Internal		Total Max Marks
					Max. Marks	Min. Pass Marks	Max. Marks	Min. Pass Marks	
MBA/4501/HC	Health Care Management & Administration	3	4	3	70	35	30	15	100
MBA/4502/HC	Human Resource Management for Health Care	3	4	3	70	35	30	15	100
MBA/4503/HC	Management of Clinical Services	3	4	3	70	35	30	15	100
MBA/4504/HC	Economics of Health Care Management	3	4	3	70	35	30	15	100
MBA/4505/HC	Information Technology in Health Care	3	4	3	70	35	30	15	100
MBA/4506/HC	Hospital Support Services	3	4	3	70	35	30	15	100

- 8) The subject code of MBA/407 in the scheme of examination of M.B.A. Semester -IV under the Appendix-D which was appended with the Direction No. 26 of 2011 be substituted by the word & figure MBA/408.

Amravati.

Dated: 5/6/2012

Sd/
(Dr.M.K.Khedkar)

Vice-Chancellor

AD

Appendix-A

Table No.1
Table of Grade, Percentage of marks and Grade points for
M.B.A.Examinations

Grade	Range of Marks obtained out of 100 or equivalent fraction	Grade Points
AA	90-100	10
AB	80-89	9
BB	70-79	8
BC	60-69	7
CC	55-59	6
CD	50-54	5
FF	Below 50	0
ZZ	Absent in Examination	

Table No.2
Table of Grade Points for SGPA and CGPA for M.B.A.Examinations

Grade Points	Final Grade
9 - 10	AA
8 - 8.99	AB
7 - 7.99	BB
6 - 6.99	BC
5.5 - 5.99	CC
5 - 5.49	CD
0 - 4.99	FF
Absent in Examination	ZZ

Table No.3
Table of Equivalence of Class/Division to CGPA

Sr. No.	CGPA	Class/Division
1.	7.5 or more than 7.5	First Class with Distinction
2.	6.00 or more but less than or equal to 7.49	First Class
3.	5.50 or more but less than or equal to 5.99	Higher Second Class
4.	5.00 or more but less than or equal to 5.49	Second Class

DIRECTION

No. 37/2012

Date : 8/11/2012

Subject : Corrigendum to Direction No. 26 of 2011 & 24 of 2012 in respect of Examinations leading to the Degree of Master of Business Administration (M.B.A.) (Semester pattern-Two year course).

Whereas, Direction No. 26 of 2011 & 24 of 2012 in respect of Examinations leading to the Degree of Master of Business Administration (M.B.A.) (Semester pattern-Two year course) is in existence in the University.

AND

Whereas, the Academic Council in its meeting held on 28/8/2012 vide Item No.91 has resolved to accept the paper titles to be revised under the Appendix-C & D of the papers MBA/3201/M, MBA/3206/M, MBA/4201/SM, MBA/4203/SM, MBA/4206/SM and MBA/4302/OB in the scheme of Examinations of M.B.A. Semester-III & IV respectively.

AND

Whereas, the Academic Council in its meeting held on 28/8/2012 has resolved to refer the matter to the Ordinance Committee to make amendments in the respective Ordinance/Regulation.

AND

Whereas, the matter for changing the scheme of examinations is required to be regulated by the Regulation, and making amendment in respective Regulation is time consuming process.

AND

Whereas, the revised titles in the scheme of examinations of Semester-III & IV of M.B.A. is to be implemented from the academic session 2012-13.

Now, therefore, I, Dr. M.K. Khedkar, Vice-Chancellor, Sant Gadge Baba Amravati University, Amravati in exercise of the

Ad.

4. Keat, Paul G & Philips K.Y. Young. Managerial Economics, Prentice Hall New Jersey 1996.
5. Koutsoyiannis, A Modern Micro Economics. New York, Macmillan, 1991
6. Milgrom, P and Roberts J. Economics Organization and Management Englewood Cliffs, New Jersey Prentice Hall Inc. 1992.
7. Maheshwari, Yogesh. Managerial Economics., P.H.I.
8. Mehta, P.L. Managerial Economics., Sultanchand & Sons.
9. Varshney, R.L. Managerial Economics., Sultanchand & Sons.

MBA/103

Managerial Skills Development

Objective: The course is aimed at equipping the students with the necessary techniques & skills of communication and presentation. It enables in developing confidence among students to perform better as professionals.

Unit-I : Managerial Skills- Nature & Concepts, objectives, significance, Managerial Skills, Employability Skills, Soft Skills and Technical Skills.

Unit-II : Importance & Nature of communication, Verbal and Non Verbal, Talking and Speaking, Communication, Principles of effective communication, Process of communication, Barriers of Communication, Types of Communication.

Unit-III : Do's and Don'ts of Business Writing, Business correspondence, Report Writing, e-communication, Resume Writing, C.V. Writing,

Unit-IV : Listening Skills, Body Language and Public Speaking, Negotiation Skill.

Unit-V : Interview Techniques, Group Discussions, Presentation skills, Meetings, Case Analysis, Brain Storming, Paper Writing and Presentation.

Suggested Readings:

1. Bowman, Joel P and Branchaw, Bemadine "Business Communication from Process to Product. 1987 Dryden Press, Chicago
2. Hatch Richard "Communicating in Business. 1977 Science Research Associates, Chicago

AD

3. Murphy, Herta A and Peck, Charries E "Effective Business Communications". 2nd ed. 1976. Tata McGraw Hill, New Delhi.
4. Pearce. C. Glenn etc. "Business Communications: Principles and Applications. 2nd" ed. 1988. John Wiley., New York.

MBA/104 Accounting for Managers

Objective:-The basic purpose of this course is to develop an insight of postulates. principles and techniques of accounting and utilization of financial and accounting information for planning decision-making and control.

Unit-I : Financial Accounting- concept, importance & scope. Generally Adopted Accounting Principles. International Financial Reporting Standards

Unit-II : Understanding Financial Statements and Balance Sheet, Measurement of Business Income, Analysis of Financial Statements: Comparative Analytical Techniques (CAT) and Relative Analytical Techniques (RAT)

Unit-III : Depreciation Methods, Inventory Valuation Methods

Unit-IV : Management Accounting Concept, Need, Importance & Scope. Budget & Budgetary control. Performance & zero Based Budgeting

Unit-V : Cost Sheet, Costing for decision making, Relevant Costing. Marginal Costing & Absorption costing.

Suggested Readings:

1. Bhattacharya S.K. and Dearden J. Accounting for Management. Text and cases. New Delhi, Vikas, 1996
2. Heitger L.E. and Matrach Serge, Financial Accounting New York, McGraw Hill, 1990
3. Hingorani N.L. and Ramnathan A.R. Management Accounting 5th ed. New Delhi, Sultan Chand, 1992.
4. Homgren Charles etc Principles of Financial and Management Accounting Englewood Cliffs, New Jersey. Prentice Hall Inc. 1994
5. Vij. Madhu Financial and Management Accounting New Delhi, Anmol Publications 1997

MBA/105 Organizational Behavior and Effectiveness

- Unit-I** : Individual Behavior – Personality, Learning, Perception, Attitude & Beliefs
- Unit-II** : Group Behavior – Meaning, Types of Groups, Group Process, Group Dynamics – factors influencing intergroup behavior and managing intergroup behavior
- Unit-III** : Organizational Change – Concept & Need, Change Process, Reasons for Resistance to Change, Measures to Overcome Resistance to Change
- Unit-IV** : Organizational Processes – Organizational Power, Organizational Politics, Empowerment, Conflict
- Unit-V** : Organizational Effectiveness – Creativity and Innovation, Corporate Governance, Management of Gender Issues

Suggested Readings:

1. Kolb, D. etc. Organizational Behaviour: An Experiential Approach. 5th ed. Englewood Cliffs, New Jersey, Prentice Hall Inc., 1991.
2. Mainiero, L.A & Tromley C.L. Developing Managerial Skills in OB. New Delhi, Prentice Hall of India, 1985.
3. Moore, M D. etc. Inside Organizations: Understanding the Human Dimensions. London, Sage, 1988.
4. Abad, Ahmad. Etc. Developing Effective Organization. New Delhi, Sri Ram Centre for Industrial Relations, 1980.
5. De Nitish. Alternative Designs of Human Organizations. London, Sage, 1988.
6. French, W.H. and Bell, C.H. Organisation Development. New Delhi, Prentice Hall of India, 1991.
7. French, W.L., etc. Organization Development Theory, Practice and Research. 3rd ed. New Delhi, Universal Book Stall, 1990.
8. Harvey, D.F. and Brown, D.R. An Experimental Approach to Organization Development. Englewood Cliffs, New Jersey, Prentice Hall Inc., 1990.
9. Huse, F.E. and Cummings, T.G. Organization, Development and Change. 3rd ed. New York, West, 1985.

10. Sinha, Dharani, P.etc. Consultants and Consulting Styles. New Delhi, Vision, 1982.

MBA/106**Business Ethics**

Objective: To acquaint the students with ethical values and practices with emphasis on Indian Values and Culture

Unit I : Indian Management – Principles, Models & Theory of Karma, Theory and Practices of Holistic Management and its relevance

Unit II : Ethics – Meaning, Objectives and Sources of Ethics, Types of Business Ethics, Factors influencing Business Ethics, Ethics V/s Morals and Values

Unit III : Managing Ethics – Theories of Ethics, Ethical Dilemma, Codes of Ethics, Normative Ethics in Management, Need and Values of Ethics in Global Change Behavioral Aspects of Ethics and Values

Unit IV : Indian Values in Management – Secular and Spiritual Values, Science and Human Values, Lessons from Ancient Indian Educational System

Unit V : Stress Management – Stress eustress, distress, Indian Perspective of Stress Management, Reasons for stress at workplace, Coping with a stress

Suggested Readings:

1. Murthy, C.S.V., Business Ethics – Text and Cases, Himalaya Publishing House Pvt. Ltd., 2nd Edition.
2. Wills, Joseph N., Business Ethics – A Stakeholder and Issues Management Approach, South Western Cengage Learning, 2003 Edition
3. Chakraborty, S.K.: Foundations of Managerial Work-Contributions from Indian Thought, Himalaya Publishing House Delhi 1998.
4. Kumar, S and N.K. Uberoi: Managing Secularism in the New Millennium Excel Books 2000
5. Gandhi, M.K. The story of My Experiment with Truth, Navjivan Publishing House, Ahmedabad, 1972.
6. Sharma Suhas, “ Eastern Door Western Windows” , New Age Publications

AD

5. Gupta S.P. Statistical Methods, 30th ed. Sultan Chand, New Delhi, 2001.
6. Golden Biddle, Koren and Karen D. Locke : Composing Qualitative Research Sage Pub. 1997.
7. Salkind, Neil J. Exploring Research 3rd ed. Prentice Hall NJ. 1997

MBA/203**Human Resource Management**

Objective: To familiarize the students with human resource management concepts, principles, functions, applications, development and research.

- Unit I :** HRM Scenario and Acquisition of Human Resources: HRM- the global and Indian Scenario, HRM for corporate excellence, Human resource planning, Human resource information system. Recruitment and selection strategies.
- Unit II :** Developing Human Resources: HRD-Concept, multiple goals, functions and organizational effectiveness. Performance Appraisal System. Potential Appraisal System and Succession Planning. Career Planning and Development, Assessment and Development Centers, Training and Development.
- Unit III :** Motivating Human Resources: Motivation at work-concept, objectives, types and applications. Participative Management-Approaches and Applications, Employee Empowerment-concept, nature, objectives, schemes and applications.
- Unit IV :** Maintenance of Human Resources: Reward System, Quality of Work Life, Organisation Development
- Unit V :** Human Resources and Knowledge Era: Knowledge Creation and Management, Virtual Organizations and HR Trends, Learning Organizations, Strategic Human Resource Management, International HRM-some Key issues.

Suggested Reading:

- 1) Sarah Gilmore & Steve Williams, Human resource management, Oxford University Press.
- 2) P. Jyothi & D.N.Venkatesh, Human Resource Management, Oxford University Press.

- 3) Biswajeet Pattanayak, Human Resource Mangement, Prentice Hall of India Pvt. Ltd.,2001
- 4) Dr. K.K.Chaudhari, Human Resource Management: Principles and Practices, Himalaya Publication, 2010.

MBA/204 Financial Management

Objective: The purpose of this course is to acquaint the students with the broad framework of financial decision making in a business unit.

- Unit-I :** Financial Management-Aims & Objectives, Financial Analysis & control. Cost-Volume Profit Analysis. Operating & Financial Leverage.
- Unit-II :** Time -value of money, Investment & capital structure Decisions . Optimum Capital structure.
- Unit-III :** Instruments of Long term and Short term Financing, Cost of different sources of raising capital, Weighted Average cost of capital.
- Unit-IV :** Valuations Bonds & Stocks, Rates of return, Methods of Capital Budgeting.
- Unit-V :** Management and Estimation of Working Capital, Internal Financing & Dividend Policy.

Suggested Readings:

1. Archer Stephen H etc. Financial Management. New York, John Wiley 1990
2. Bhalla V.K. : Financial Management and Policy 2nd ed. New Delhi Anmol, 1998
3. Brealey. Richard A and Myers Stewart C. Principles of Corporate Finance 5th ed. New Delhi McGraw Hill 1996
4. Hampton, John Financial Decision Making Englewood Cliffs, New Jersey, Prentice Hall inc. 1997.
5. Van Home James C : Financial Management and Policy 10th ed. New Delhi, Prentice Hall of India- 1997
6. Winger, Bernard and Mohan Nancy. Principles of Financial Management New York, Macmillan Publishing Company. 1991 .
7. Prasanna Chandra, " Financial Management-Theory and Practice", Tata McGraw Hill 4th, 5th, 6th, 7th Ed.

AD

- Unit II** : Rural consumer behavior – buyer characteristics, decision process and behavior patterns, evaluation procedure, brand loyalty, innovation adoption.
- Unit III** : Information System for Rural Marketing – Concepts, Significance, Internal Reporting System, Marketing Research System, Decision Support System. Selecting and Attracting Markets – Concepts and Process, Segmentation, Degrees, Bases, and guides to effective Segmentation, Targeting and Positioning.
- Unit IV** : Product Strategy for rural Markets, Concept and Significance, Product Mix and Product Item Decisions, Competitive Product Strategies. Pricing Strategy in Rural Marketing – Concept, Significance, Objectives, Policy and Strategy.
- Unit V** : Promotion towards rural audience, exploring media, profiling target audience, designing right promotion strategy and campaign, Rural Distribution – Channels, old setup, new players, new approaches, coverage strategy.

Suggested Readings:

1. C.S.G Krishnamacharyulu & Lalitha Ramakrishnan, “Rural Marketing” – Text and Cases, Pearson Education.
2. C.S.G Krishnamacharyulu & Lalitha Ramakrishnan, “Cases in rural marketing and integrated approach”. Pearson education.
3. Robert Chambers, “Rural Development: Putting the last first”, Pearson Education.

MBA/4206/SM International Marketing Environment

- Unit I** : Distinction between International Marketing and Domestic Marketing, Economic Environment of International Marketing, International Institutions – UNCTAD, WTO, Trade Agreement – Free Trade Area, Customs Union, Common Market, Evolution of International Business Theories.
- Unit II** : Overview of India & World Trade – EXIM Policy, Foreign Trade Policy and Regulation, Trading Partners – Bilateral & Multilateral Trade Agreement, International Market Place & Space, Barriers, International Politics & Economic Integration, Trade Blocks.

- Unit III** : Institutional Infrastructure for Export Promotion – Export Promotion Councils (EPC), Public Sector Trading Agencies – ECGC, Commodity Board, Export – Import Management – Registration of Exporters, Procedure & Documents, Export Quotations.
- Unit IV** : Shipping and Transportation, Insurance, Negotiations of Documents, Instruments of Payments – Open Account, Bills of Exchange, Letter of Credit, Export Finance.
- Unit V** : Trade and BOP of India, Technological Developments and International Marketing..

Suggested Readings:

1. International Marketing Mgt. : U.C. Mathur, SAGE
2. International Business: Justin Paul, PHI
3. International Business: K. Aswathappa, TATA McGraw Hill
4. International Marketing : Rakesh Mohan Joshi, Oxford
5. International Marketing: R. Shrinivasan, PHI
6. International Marketing : B.S. Rathore, Himalaya Publishing, J.S. Rathore, BM Jani House

MBA/4301/OB Human Behaviour At Work Place

Objective: To familiarize the students with organizational behaviour-concepts, components, theories and applications.

Unit I: Organizational Behaviour: Definition, Objectives, Key Elements and nature. Organizational Behaviour Process, models, Organizational Behaviour systems and its elements. Overview of evolution of Organizational Behaviour. Contributing disciplines to Organizational Behaviour. Organizational Behaviour: An Individual Perspective- Individual and Individual Difference, Human Behaviour and its causation, models of man, whole person approach including physical, psychological, mental, emotional and spiritual level.

Unit II : An overview of Organizational Behaviour focusing at individual level: Intelligence, Emotions and moods, abilities, competencies and skills, personality, perception, attitudes, values, motivation and learning.

AD

Personality: concepts, Theories and determinants, applications in Organizational Behaviour.
Perception: Definition, Difference between perception and sensation, factors affecting perception, improving perceptions and applications in Organizational Behaviour.
Attitudes and Values: Attitudes- concepts, formation, types, measurement and attitude change. Overview of values and its application in Organizational Behaviour

Unit III : Job Satisfaction, Organizational commitment and loyalty: Overview, Concept and Applications in Organizational Behaviour Emotions and moods-types, sources and theories with applications in Organizational Behaviour. Emotional Intelligence, Transactional Analysis. Overview of Motivation and Morale in Organizational Behaviour, Overview of Group Dynamics- Meaning, Types of Groups & Group Processes.

Unit IV : Learning and Learning Behaviour: Learning- Meaning, Definition, Principles and concept of reinforcement, punishment. Learning Behaviour-Concept, Models and its applications. Conflict and Conflict Resolution-Definition, sources, types, aspects of conflicts. Conflict resolution and management, overview of negotiation and negotiation strategies, Counseling, Participative management.

Unit V : Organizational Behaviour at Organizational level: Organizational culture and climate-Organizational culture its definition, types, functions, managing culture. Creating, sustaining and changing culture. Organizational Climate-Concept, Dimensions, Determinants and comparison with organizational culture. Quality of Work life- Concept, Meaning and Applications.

Suggested Readings:

1. Kolb, D. etc. Organizational Behaviour: An Experiential Approach. 5th ed. Englewood Cliffs, New Jersey, Prentice Hall Inc., 1991.
2. Mainiero, L.A & Tromley C.L. Developing Managerial Skills in OB. New Delhi, Prentice Hall of India, 1985.
3. Moore, M D. etc. Inside Organizations: Understanding the Human Dimensions. London, Sage, 1988.

4. Abad, Ahmad. Etc. Developing Effective Organization. New Delhi, Sri Ram Centre for Industrial Relations, 1980.
5. De Nitish. Alternative Designs of Human Organizations. London, Sage, 1988.
6. French, W.H. and Bell, C.H. Organisation Development. New Delhi, Prentice Hall of India, 1991.
7. French, W.L., etc. Organization Development Theory, Practice and Research. 3rd ed. New Delhi, Universal Book Stall, 1990.
8. Harvey, D.F. and Brown, D.R. An Experimental Approach to Organization Development. Englewood Cliffs, New Jersey, Prentice Hall Inc., 1990.
9. Huse, F.E. and Cummings, T.G. Organization, Development and Change. 3rd ed. New York, West, 1985.
10. Sinha, Dharani, P.etc. Consultants and Consulting Styles. New Delhi, Vision, 1982.

MBA/4302/OB Organizational Development and Intervention Strategies

Unit-I : Organization Development: Concept and Theory of Development, Approaches to Problem Diagnosis.

Unit-II : Organizational Development Techniques: Steps in OD, General OD Competencies, OD Skills.

Unit-III : OD Evaluation: Evaluation of OD, Ethics of OD Professional, Future of OD. Organizational Effectiveness-concept, objectives, nature and need.

Unit-IV : Organizational Change: Concept, Objectives, Nature, Types, Models and Implementation. Change Strategies. Change Agent.

Unit-V : Organizational Interventions: Major OD Intervention Techniques, Designing Interventions, Interpersonal Interventions, Team Interventions, Inter-group Interventions.

Suggested Readings:

1. Theory of OD & Change; Cummings/Worley Cengage Learning
2. Od Behavior Science, Intervention for Org. Improvement; Wendell L.French (ecil H. Bell Jr.), PHI

AD :