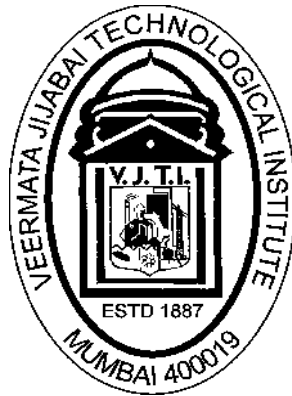


VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
(VJTI)
MATUNGA, MUMBAI 400 019



MINUTES OF

First Meeting of the

Academic Council

Held on

Tuesday, April 30, 2013 at 2.30 pm

At

DEP I Hall,

VJTI, Matunga, Mumbai 400 019

Veermata Jijabai Technological Institute
Minutes of first Meeting of Academic Council
Tuesday, April 30, 2013 at 2.30 pm

First Meeting of Academic Council was held on Tuesday, April 30, 2013 at 2.30 pm at DEP I Hall. Following members and invitees were present:

1.	Dr. O G Kakde, Director & Chairman
2.	Dr. B Ravi, External Expert member
3.	Dr. D N Badodkar, External Expert member
4.	Dr. A V Topkar, External Expert member
5.	Dr. P H Sawant, Invitee
6.	Dr. P U Gharpure, Invitee
7.	Dr. M S Panse, Head, Electrical Engg. Dept.
8.	Dr. B B Meshram, Head, Computer & IT Dept.
9.	Dr. A N Bambole, Head, Structural Engg. Dept.
10.	Dr. S Y Mhaske, Head, Civil Engg. Dept.
11.	Dr. V M Phalle, Head, Mechanical Engg. Dept.
12.	Dr. A K Rakshit, I/C Head, Textile Manufactures Dept.
13.	Pf. P M Ravanan, I/C Head, Production Engg. Dept.
14.	Dr. S S Sane, Head MCA Dept.
15.	Dr. D S Wavhal, Head Physics Dept.
16.	Dr. A D Padhye, Head, Chemistry & I/C Head, Mathematics Dept.
17.	Pf. U. Nair, Head, Humanities Dept.
18.	Dr. H A Mangalvedekar, Professor, Electrical Engineering Dept.
19.	Prof. P M Chavan, Asso. Professor, Computer Engg. & Information Technology Dept.
20.	Prof. R M Tayde, Asst. Professor, Mechanical Engineering Dept.
21.	Dr. R N Awale, Immediate Past Dean (Academics)
22.	Dr. R D Daruwala, Dean (Academic Programs) & Member Secretary

Item Nos. 1 & 2

Chairman, Academic Council, welcomed all members and invitees to the first meeting of Academic Council of VJTI. He explained that as per a recent GR of the Government of Maharashtra, it was required for the institute to have an Academic Council as per XI plan guidelines of University Grants Commission (UGC) for autonomous colleges. The Board of Governors had taken note of it and formation of the Academic Council has been done to replace the Senate, which was in existence since the time institute was declared autonomous by Government of Maharashtra.

The Member Secretary informed the members and invitees that in line with the XI plan guidelines of UGC for autonomous colleges, the institute shall have an academic structure as follows:

Academic Council – the highest academic body

Functions:

Without prejudice to the generality of functions mentioned, the Academic Council will have powers to:

- a. Scrutinize and approve the proposals with or without modification of the Boards of Studies with regard to courses of study, academic regulations, curricula, syllabi and modifications thereof, instructional and evaluation arrangements, methods, procedures relevant thereto etc., provided that where the Academic Council differs on any proposal, it will have the right to return the matter for reconsideration to the Board of Studies concerned or reject it, after giving reasons to do so.
- b. Make regulations regarding the admission of students to different programmes of study in the college.
- c. Make regulations for sports, extra-curricular activities, and proper maintenance and functioning of the playgrounds and hostels.
- d. Recommend to the Governing Body proposals for institution of new programmes of study.
- e. Recommend to the Governing Body institution of scholarships, studentships, fellowships, prizes and medals, and to frame regulations for the award of the same.
- f. Advise the Governing Body on suggestions(s) pertaining to academic affairs made by it.
- g. Perform such other functions as may be assigned by the Governing Body.

Terms of Members:

The term of the nominated members shall be two years.

Board of Studies in a concerned discipline

Functions:

The Board of Studies shall:

- a. Prepare syllabi for various programs, keeping in view the objectives of the autonomy and the requirements of stakeholders and recommend to the Academic Council for consideration.
- b. Suggest methodology for innovative teaching and evaluation techniques;
- c. Coordinate teaching learning processes, research, and other academic activities.
- d. Deliberate and advise the Academic Council on any matter referred to it.

Terms of Members:

The term of the nominated members shall be two years.

Department Academic Committee (DAC)

Committee will meet frequently (preferably in fortnight) and deal with the routine problems of the students and act as the monitoring & evaluation committee for the department. The committee will forward the recommendations regarding routine matters to Dean (Academic Programmes) / Controller of Examinations - degree (CoE).

Functions:

- a. Counsel the students in terms of rules and regulations of the programme.
- b. Deal with routine queries communicated in writing by the students in the department and recommend the case in line with Institute rules to CoE for further processing. Dean (Academic Programs), with endorsement of CoE if required, will approve/disapprove the case. Dean (AP) / CoE shall communicate the decision to concerned department committee for further action to be initiated, if any.
- c. Monitor the implementation of academic calendar and in semester evaluation in respective department. The DAC shall submit the report to Board of Studies with clear observations in the semester in terms of maintaining educational standards and suggestions for further improvement in the system, if any.
- d. Suggest innovative ideas to improve the standard of teaching learning method. Also suggest the methodology and counter checks on the processes to the board of studies for implementation.
- e. Coordinate the conduct of examination in the department and act as liaison between department and Examination Section.
- f. Prepare and continuously update the Self-Assessment Report (SAR) required for accreditation from NBA / AICTE.
- g. Any other matter instructed or referred by Chairman, Academic Council / Dean (Academic Programs).

Terms of Members:

The term of the members other than Ex-officio members shall be two years.

The Member Secretary further informed that agenda for this meeting primarily focused on modifying the existing rules and regulations governing all Undergraduate, Postgraduate, and Doctoral Programs to align with the new academic structure as proposed. Structural changes are not contemplated at this moment. They would be taken up when next curriculum revision takes place, which is likely to be from academic year 2014-15 onwards.

Item no. 3

Ratification of Manual of Rules for Four Year Undergraduate Programmes Leading to Bachelor of Technology (B Tech)

Member Secretary explained that there were no major modifications proposed to the existing rules, but since AICTE in its Pay Scales, Service conditions and qualifications of the teachers and Academic staff in Technical Institutions (Degree) Regulations, 2010, numbered FNo. 37-3/legal/2010 dated 5th March 2010, clearly specified that if a Grade Point System is adopted, CGPA will be converted as “6.75 grade points is equivalent to 60 %, which is recognized as a first class. Hence from academic year 2013-2014 onwards, instead of the current 6.5 CPI equivalent to a first class, 6.75 CPI would be equivalent to a first class for all students pursuing their course of studies in different undergraduate and postgraduate programmes at VJTI.

During the discussion of the additional semester called “Summer semester or Summer term”, Chairman was of opinion that courses should be offered only if faculty is available for their conduct.

During the discussion on current grading practice at VJTI it was seen that if the student does not pass the course in first attempt, the student is awarded a reasonable grade on the basis of performance in the second attempt (re-examination), however maximum grade awarded is AB.

If the student fails to pass even in second attempt, the student has to appear the end semester examination of that course in a subsequent semester whenever the course is offered. If a student

passes in this examination, only the lower most passing grade (DD) is awarded in that course. This practice was felt by members to be not in tune with best practices and a need for change was felt. After discussions, it was decided that no change in the earned grades would be made for any student for whatever attempts the student makes. For the second and third attempt, the student's grade sheet will indicate correct earned grade with remark "Passed in second/third attempt". A student will have a maximum of three attempts to pass a course. Further, if a student repeats a course, the grade sheet will indicate "course repeated and the number of attempt". The most recent grade for the course shall be taken into account for the computation of SPI / CPI. The final approved Manual of Rules for Four Year Undergraduate Programmes Leading to Bachelor of Technology (B Tech) is put up as Annexure I

Item no. 4

Ratification of Manual of Rules for Three Year Master of Computer Applications Programme and Two Year Post Graduate Programmes leading to Master of Technology (M Tech) degree.

During discussion it was resolved that for all post graduate programs also, from academic year 2013-2014 onwards, instead of the current 6.5 CPI equivalent to a first class, 6.75 CPI would be equivalent to a first class. Further, the modifications suggested in rules for grading for undergraduate programs may be made equally applicable to all post graduate programs.

The final approved Manual of Rules for Postgraduate Programmes Leading to Three Year Master of Computer Applications Programme and Two Year Post Graduate Programmes leading to Master of Technology (M Tech) degree is put up as Annexure II.

Item no. 5

Ratification of Manual of Rules for Doctoral Programs leading to Doctor of Philosophy (Technology) degree.

During discussion it was resolved that research scholars working towards a full time Ph.D. program should carry out research for atleast three years before they are permitted to submit their synopsis, while research scholars working towards a part time Ph.D. program should carry out research for atleast four years before they are permitted to submit their synopsis.

The final approved Manual of Rules for Doctor of Philosophy (Technology) Programmes is put up as Annexure III.

Item no. 6

Ratification of draft scheme of instruction and evaluation for M.Tech. Programme in Project Management as well detailed syllabi for all courses.

During discussion members commented that such a program was the need of the hour and eligibility criteria for admission to this program should be broad based so as to allow candidates from different engineering disciplines to be admitted to this program. Members also felt that there was scope for increasing the number of elective courses. The course codes would be decided as per current institute practice for post graduate courses.

The final approved scheme of instruction and evaluation for M.Tech. Programme in Project Management as well as detail syllabi for all courses is put up as Annexure IV

Item no. 7

Any other matter with permission of Chair

- a. Nomination of two members on Boards of studies by the Academic Council

Members discussed the names suggested and gave their recommendations. The final approved list of members nominated by Academic Council to the Boards of Studies is as follows:

S No	Name of the Board	Nomination of members
	Board of Studies in Civil Engineering	Dr. Tom Mathew, Professor, Department of Civil Engg., IIT Bombay Dr. Deepankar Choudhury, Professor, Department of Civil Engg., IIT Bombay
	Board of Studies in Mechanical Engineering	Dr. P S Gandhi, Asso Professor, Department of Mechanical Engg., IIT Bombay Mr. N L Soni, Head, Fluid Power & Tribology Section, BARC
	Board of Studies in Electrical Engineering	Dr. S D Varwandkar, Ex-Director, VJTI Dr. Madhu Belur, Asso Professor, Department of Electrical Engg, IIT Bombay
	Board of Studies in Production Engineering	Dr. L Ganapathy, Professor, NITIE Dr. K P Karunakaran, Professor, Department of Mechanical Engg., IIT Bombay
	Board of Studies in Textile Technology	Dr. S K Chattopadhyay, Director, CIRCOT, Adenwala Road, Matunga, Mumbai - 400019 Dr. M. K. Talukdar, Ex-Prof. VJTI, Industrial Consultant, Kusumgar Corporates, 101, Manjushree, JVPD Scheme, Mumbai
	Board of Studies in Electronics Engineering	Dr. Joseph John, Professor, Department of Electrical Engg, IIT Bombay Dr. N S T Sai, Training Manager, Tech Mahindra
	Board of Studies in Computer Engineering & Information Technology	Dr. J V Aghav, Professor & Head, Department of Computer & IT, College of Engg. Pune Dr. R C Thool, Professor & Head, Department of IT, SGGSIET, Nanded
	Board of Studies in Structural Engineering	Dr. Tarun Kant, Professor, Department of Civil Engg., IIT Bombay, Dr. G R Reddy, SO H+, BARC
	Board of Studies in Computer Applications	Prof. Pradeep Pendse, Dean IT/ E-business / Business Design, Welingkar Institute, Dr. S. M. Mahajan, Director, MET College Bandra (West), Mumbai

b. Authorizing Chairman, Academic Council, to approve special cases

The Academic authorities of the institute come across special cases of students at Undergraduate and postgraduate levels including Doctoral level. The Academic council of VJTI authorizes Chairman, Academic Council VJTI, to deal with all special cases and take necessary action on case to case basis.

The meeting ended with a vote of thanks.

Annexure I

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

(Autonomous Institute affiliated to University of Mumbai)

**Manual of Rules
For**

**Four Year Undergraduate Programmes Leading to
Bachelor of Technology (B Tech)
In**

- 101 Civil Engineering
- 102 Mechanical Engineering
- 103 Electrical Engineering
- 104 Production Engineering
- 105 Textile Technology
- 106 Electronics Engineering
- 107 Computer Engineering
- 108 Information Technology
- 109 Electronics & Telecommunication Engineering

To be implemented from the batch admitted in Academic Year 2013-14

INTRODUCTION

This manual sets out the rules, procedures and requirements of the undergraduate programmes of study that fall under the purview of Academic Council of VJTI.

The rules and regulations described in this manual are applicable to undergraduate autonomous programmes listed below:

- 101 Civil Engineering
- 102 Mechanical Engineering
- 103 Electrical Engineering
- 104 Production Engineering
- 105 Textile Technology
- 106 Electronics Engineering
- 107 Computer Engineering
- 108 Information Technology
- 109 Electronics & Telecommunication Engineering

1. Admissions

Admissions to the first year of all the programmes is made before the start of each academic year as per the procedure finalized by the Competent Authority appointed by Government of Maharashtra state, from time to time. A limited number of students having a Diploma in relevant branch of engineering are admitted at the second year of all the programmes under the lateral entry scheme procedure finalized by the Competent Authority appointed by Government of Maharashtra state.

The Institute reserves the right to revoke the admission made to a candidate, if it is found at any time after admission that she/he does not fulfill all the requirements stipulated in the offer of admission.

The Institute also reserves the right to cancel the admission of any student and discontinue her/his studies at any stage of studentship for unsatisfactory academic performance and/or undisciplined conduct.

2. Academic Calendar

The academic activities of the Institute are regulated by Academic Calendar approved by the Academic Council, and released at the beginning of each year. It is mandatory for students and faculty to strictly adhere to the academic calendar for completion of academic activities. Academic Calendar can be seen on Institute website (<http://www.vjti.ac.in>). There are two

Semesters (Terms) in an academic year (Odd or Autumn semester – July to Nov; and Even or Spring semester – January to April) during which all courses specified for various degree programmes are offered. There is one additional Semester during summer vacations, called the Summer Semester. The summer semester (term) is **optional** and is only for students who have failed in the previous odd and / or even semesters and would like to repeat course(s). Courses for summer term are offered by the departments only on availability of faculty to conduct the courses. For the summer term, a course is offered in classroom mode if more than ten students register for a course, otherwise it is offered in self-study mode under guidance of a faculty. All the students are required to follow certain procedures and meet specified academic requirements for each semester.

3. Attendance

Attendance in the class is compulsory and is monitored every four weeks. The Institute expects 100% attendance. However, due to ill-health or other emergency situations, absence up to 20% is considered on case to case basis on production of documentary proof. In case, attendance of a student falls short by more than 20%, the course instructor shall warn the student in writing every four weeks and keep the Programme coordinator / Head of Department informed. In case of a student whose attendance falls short by more than 20% at the end of a semester, the Department Academic Committee (DAC) shall forward details of the same along with specific recommendation to Dean (Academic Programs) for further action. A student not having 80% attendance is likely to be debarred from appearing in the semester-end examination and given a “RR” grade. Such a student is required to re-register for the same course in a subsequent semester, when the course is offered next. In case a student is unable to attend classes for more than four weeks in a semester, she/he may apply to the Dean (Academic Programs) through Chairman, DAC, for withdrawal from the semester, which means, withdrawal from all the registered courses in the semester. However such application should be made as early as possible and latest before the start of End Semester Examination. The attendance requirement is applicable to summer term courses too. Any application on medical grounds should be accompanied with a medical certificate from a registered medical practitioner containing the registration number of the practitioner.

4. Programme Structure

All students admitted for any of the undergraduate programmes, undergo a four year - eight-semester programme. Every B. Tech. programme has a prescribed course structure which in general is termed as the Curriculum. It prescribes all the theory courses, laboratory courses and other requirements for the degree and sets out the nominal sequence semester-wise. It also gives the syllabi and a list of textbooks and reference books for each course.

4.1: Course Credit Structure

In general, a certain quantum of academic work measured in terms of credits is laid down as the requirements for the B. Tech. degree. A student earns credits by satisfactorily passing courses and carrying other academic activities every semester. The amount of credits associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credits associated with any of the other activities are dependent upon the quantum of work expected to be put in for each of the other activity per week.

4.2: Theory and Laboratory Courses

Courses are broadly classified as Theory courses and Laboratory Courses. Theory courses consist of lecture (L) and tutorial (T) hours. Laboratory courses consist of practical hours. Credit (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of zero point five (0.5) for laboratory hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of four (4). Similarly, a laboratory course having three laboratory hours per week throughout semester carries a credit of 1.5. The undergraduate project carries 08 credits. General pattern of the contact hours and credits for a typical semester is as indicated below:

Lecture	Tutorial	Practical	Co-Curricular	Total Hours	Total Credits
15	3	12	5	35	24

The scheme is prescribed in following format:

Course Name	Hours/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
	L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
Theory Course 1	3	1	-	4	10	30	60	100	3
Theory Course 2	3	-	-	3	10	30	60	100	3
Theory Course 3	3	-	-	3	10	30	60	100	3
Theory Course 4	3	1	-	4	10	30	60	100	3
Theory Course 5	3	1	-	4	10	30	60	100	3
Total	15	3	-	18					
Course Name	Hours/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
	L	T	P		TA	ESE (O / P)	Total	ESE (P) (hrs)	
Lab Course 1	-	-	3	1.5	50	50	100	-	
Lab Course 2	-	-	3	1.5	50	50	100	-	
Lab Course 3	-	-	3	1.5	50	50	100	-	
Lab Course 4	-	-	3	1.5	25	-	25	-	
Total	-	-	12	6					
Course Name	Hours/Week			Non Credit					
	L	T	P						
Industry-Academia Interaction	-	-	2	Attended/Not Attended					
E-Library/ Internet	-	-	3	-					
Total	-	-	5						

4.3:Project:

Project is a course wherein, under the guidance of a faculty member assigned by the Department, a student or a group of students (not more than four students in a group) is required to do some innovative work with the application of knowledge gained while undergoing various courses in the earlier semesters. The student is expected to do a survey of literature in the subject, work out a project plan and carry it out through experimentation and/ or modeling /

computation. Through the project work the student has to exhibit skills for both analysis and synthesis. In case of group project, role of every individual should be clearly defined.

The project is evaluated in two stages. The first stage evaluation shall be done at the end of pre-final semester by a Committee of Institute faculty (at least two faculty members including project guide). The Project Guide along with an external examiner carries out the second stage evaluation at the end of final semester.

The first stage assessment has 25% weightage. Another 25% weightage is given for the initiative, interest, effort and sincerity shown by the student during the entire project work. The second stage assessment has 50% weightage.

The first stage evaluation is carried out after a minimum of 12 weeks of work by a committee comprising a minimum of two internal examiners including the guide. The final project report should be submitted in the prescribed format at least two weeks prior to the end of final semester or by the prescribed date and second stage assessment can be done in the week earmarked for practical / oral examinations in the Academic Calendar. The second stage assessment is carried out by a committee comprising a minimum of two examiners including the guide and an external examiner.

The undergraduate project carries eight (08) credits. The grade for the project shall be declared only after second stage evaluation. In case a student is awarded EE or FF grade, the student has to submit the report afresh (even if the Project is a group project) and undergo the second stage assessment again. Students submitting the reports late or those who have to re-submit the report due to fail grades will have a mention “Project passed in second / third attempt” on their grade sheet.

The student should submit two soft bound printed copies for the first stage assessment and three soft bound printed copies for the second stage assessment. After successfully completing second stage assessment, the student /group should submit one hardbound copy to the Department for record and a softcopy in CD for archival in library.

4.4: Non-Credit Requirement – English Language Test:

All students admitted to first year of four year degree programme have to appear for a VJTI English language test (VELT) conducted in Semester I. Those students, who fail to qualify in this test, have to register for an English language course in Semester II. No credits are awarded

for passing this test or the course examination, but a PASS (grade of P) in this VELT or the course examination is essential for award of the Degree. However, if a student fails to get a PASS (Grade of P) before entering into Second year, the student shall have to undergo a course in the summer term in the Language Laboratory.

5. Examination / Assessment:

5.1: Modes of Evaluation

Semester wise performance assessment of every registered student is done through various modes of examination. These include quizzes, class tests, home assignments, group assignments, viva-voce, Mid-Semester Examination and Semester-End Examination. The Instructor will announce the modes of evaluation and distribution of weightage for each of the assessments at the beginning of the course. Various modes of assessment for theory and laboratory courses along with the recommended relative weightage of various components are given in this section.

5.1.1: Modes of Evaluation for Theory Courses

The Institute follows a continuous evaluation system. A typical theory course evaluation shall have term-work assessment carried by the teacher (TA), in-semester test (IST) and an end-semester examination (ESE). The term-work assessment (TA) will be carried out by the course instructor on the basis of at least four components like attendance, quiz, assignments, problems, paper or report on a topic, seminar etc.

For Evaluation against In-semester tests (IST), there will one mid-semester test (MST) and two class tests (one prior and one after the mid semester test). The Mid semester test will carry forty marks and the two class tests will carry ten marks each. Score for In-semester tests will be calculated by giving 33% weightage to both of the class tests together and 67 % weightage to MST. The weightage assigned to each of the evaluation components for each course is indicated along with the scheme of evaluation. The weightages for term work assessment, in-semester tests and end-semester examination for each course is 10:30:60. The course instructor shall continuously grade the performance of the student in various components of the term-work and the student shall be kept informed about the performance. The instructor has to prepare a marks list for the performance of students in the in-semester tests. The test papers are returned to the students after taking signature of the students on the marks list. Sample copies (at least five) of the term-work of all courses, on the basis of which the term work assessment is done, has to

be preserved in the department for a period of at least three academic years. The end semester examination covers full syllabus of the course.

Attendance in the end semester examination is compulsory. If a student misses the examination due to personal illness, accident or any untoward incident, the student should apply to the Controller of Examinations through the DAC within three days for a permission to appear for next examination. If the student fails to produce the necessary proofs, the student will be deemed to be failed in those courses and will be awarded RR grade. The student is then required to repeat the courses. Evaluated end-semester examination answer books shall be preserved by the Academic office for a period of at least one academic year.

5.1.2: Modes of Evaluation for Laboratory Courses

The assessment in a laboratory course is based on turn-to-turn supervision of the student's work, her/his performance in viva-voce examinations and group discussions, the quality of their work as prescribed through laboratory journals and a semester-end practical or oral examination. It is obligatory to maintain a laboratory journal as prescribed by the course instructor. The weightages are 50:50 for term work assessment and end-semester examination.

The first year workshop course will be evaluated only on the basis of performance of the practical work during the semester.

5.2: Grading

The Institute follows a relative grading system. Based on the combined performance in all assessments, the student is awarded a letter grade in every course taken by her/him in a particular semester as per the curriculum. The grade awarded to a student depends not on her / his absolute performance but her / his performance relative to other students in her / his class. These letter grades not only indicate a qualitative assessment of the student's performance but also carry a quantitative (numeric) equivalent called the Grade Point. The letter grades and their equivalent grade point are given as follows

Grading Scheme		
Letter Grade	Grade Point	Indicative degree of mastery
AA	10.0	Outstanding
AB	9.0	Excellent
BB	8.0	Very good
BC	7.0	Good
CC	6.0	Satisfactory
CD	5.0	Average
DD	4.0	Marginal
EE	2.0	Unsatisfactory
FF	0.0	Very weak

Letter Grade	Explanation
AU	Audit
PP / NP	Passed / Not Passed
A / NA	Attended / Not Attended
II	Incomplete due to non-appearance in end semester examination on health grounds.
RR	Fail due to lack of attendance or non-appearance in end semester examination, should repeat the course.
The above grades do not have any grade points associated with them.	

The student passes the course if she/he scores any grade from AA to DD, grades EE and FF being fail grades.

The II (Incomplete) grade is awarded due to non-appearance in end semester examination on health grounds. The student has to appear for the end semester examination for the course when it is conducted next.

The RR grade is awarded if the student fails to have minimum attendance for the classes (including laboratory courses) or if the student fails to attend the end-semester examination without having any valid reasons. Such a student has to repeat that course whenever it is offered again.

A student has to pass a course in not more than three end-semester examinations, including any re-examination (make-up examination) conducted for the course. If the student fails to do so, she/he has to repeat the course whenever it is offered next.

If a student fails to appear for any of the end-semester examination due to reasons beyond control, the student should inform the Head of the department or First year In-charge within five days of start of examination.

A student will have a maximum of three attempts to pass a course. For the second and third attempt, the student's grade sheet will indicate "Passed in second/third attempt"

If a student repeats a course, his grade sheet will indicate "course repeated".

The most recent grade for the course is taken into account for the computation of SPI / CPI. There is no provision for improvement of grades in individual courses.

5.4: Academic Malpractice

Academic malpractices are severely dealt with. In case of malpractice during any evaluation like assignments, quizzes, tests, and examinations, the case is referred to Unfair Means Committee formed for the purpose. A student is suitably punished if the unfair means committee prima facie finds the student has resorted to malpractice or any other unfair means.

5.5: Performance Indices

5.5.1: Semester Performance Index (SPI)

The performance of a student in a semester is indicated by a number called Semester Performance Index, SPI. The SPI is the weighted average of the grade points obtained in all the courses registered by the student during the semester. For example, if a student appears for five courses (Theory/labs./Projects/ etc.) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and her/his grade points in these courses are g₁, g₂, g₃, g₄ and g₅ respectively, then her/his SPI is equal to:

$$SPI = \frac{C_1g_1 + C_2g_2 + C_3g_3 + C_4g_4 + C_5g_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SPI is calculated to two decimal places.

The SPI for any semester will take into consideration the RR/II grades awarded in that semester. For example if a student has failed in course 4 with FF grade, the SPI will then be computed as:

$$SPI = \frac{c_1g_1 + c_2g_2 + c_3g_3 + c_4 * 0 + c_5g_5}{c_1 + c_2 + c_3 + c_4 + c_5}$$

5.5.2 Cumulative Performance Index (CPI)

An up to date assessment of the overall performance of a student from the time she/he entered the Institute is obtained by calculating a number called the Cumulative Performance Index, CPI, in a manner similar to the calculation of SPI. The CPI therefore considers all the courses registered by the student, towards the minimum requirement of the degree she/he has enrolled for, since she/he entered the Institute. The CPI is calculated at the end of every semester to one decimal place and is indicated in semester grade reports. In the semester where the student has failed in course(s), her/his grade sheet will not indicate any CPI.

A CPI of 6.75 or above will be considered as equivalent to First Class (60%) of similar programmes of the University. The institute may issue a separate certificate mentioning first class to only those candidates acquiring CPI 6.75 or above.

6. Programme duration

A student who fails to graduate within eight years from the date of first registration to the programme shall be terminated from the programme.

7. Promotion to next year for UG Programme

A student will be promoted and allowed to register for the Second year if she/he has acquired minimum of 36 credits in first year.

A student will be promoted and allowed to register for the Third year if she/he has passed all the courses of first year and earned a minimum of 36 credits of second year.

A student will be promoted and allowed to register for the Final year if she/he has passed all the courses of second year and earned a minimum of 36 credits of third year.

8. Change of Branch

Students are eligible to apply for change of Branch after completing the first two semesters. The following rules/guidelines will be used for considering applications for change.

Branch change at the end of first year shall be followed strictly as per merit based on CPI at the end of first year. Due to transfers, strength of a branch cannot be more than sanctioned strength.

9. Eligibility for the Award of Degree

The names of the students who satisfy below mentioned requirements shall be forwarded to the University of Mumbai for award of B Tech in the relevant discipline.

- The student should have studied and passed all the courses and acquired necessary number of credits as per the requirements of a particular degree programme and as prescribed by the Institute from time to time within eight years from date of first registration to programme.
- The student should have paid all the Institute and University dues including the dues of Department, Hostels, Library and other units.
- The student should have obtained a CPI of atleast 4.00 at the end of the semester in which she/he completes all the requirements for the award of Degree;
- No case or disciplinary action is pending against her/him.

10. Improvement in CPI

If a student has graduated, but wishes to improve her / his CPI, she / he will have to appear for end semester examination of atleast **three** courses as recommended by DAC (except for the project) of Semester VII and Semester VIII within two years of graduation by paying the required examination fees. Only one attempt is provided for such improvement. For exceptional cases, permission may be granted to appear for end semester examination of at most two courses from Semester VI. The result of such examination will be declared only if there is improvement in CPI over earlier CPI.

Annexure II

VEERMATAJIJABAITECHNOLOGICALINSTITUTE

(Autonomous Institute affiliated to University of Mumbai)

Manual of Rules

For

201 Three Year Master of Computer Applications Programme

And

Two Year Post Graduate Programmes Leading to
Master of Technology (M.Tech.)

in

- 202 Civil Engineering (with specialization in Environmental Engineering)
- 203 Civil Engineering (with specialization in Construction Management)
- 204 Civil Engineering (with specialization in Structural Engineering)
- 205 Computer Engineering
- 206 Electrical Engineering (with specialization in Power Systems)
- 207 Electrical Engineering (with specialization in Control Systems)
- 208 Electronics Engineering
- 209 Mechanical Engineering (with specialization in Machine Design)
- 210 Mechanical Engineering (with specialization in Automobile Engineering)
- 211 Mechanical Engineering (with specialization in CAD/CAM & Automation)
- 212 Production Engineering
- 213 Textile Technology
- 215 Electronics & Telecommunication Engineering
- 214 Mechanical Engineering (with specialization in Mechatronics)
- 216 Mechanical Engineering (with specialization in Thermal Engineering)
- 217 Computer Engineering (with specialization in Network Infrastructure
Management Systems)
- 218 Information Technology (with specialization in Software Engineering)
- 219 Project Management

To be implemented from the batch admitted in AcademicYear2013-14

INTRODUCTION

This manual sets out the rules, procedures and requirements of the postgraduate programmes of study that fall under the purview of Academic Council of VJTI.

The rules and regulations described in this manual are applicable to three years “201 Master of Computer Applications” Programme and two year Master of Technology programmes listed below:

202	Civil Engineering (with specialization in Environmental Engineering)
203	Civil Engineering (with specialization in Construction Management)
204	Civil Engineering (with specialization in Structural Engineering)
205	Computer Engineering
206	Electrical Engineering (with specialization in Power Systems)
207	Electrical Engineering (with specialization in Control Systems)
208	Electronics Engineering
209	Mechanical Engineering (with specialization in Machine Design)
210	Mechanical Engineering (with specialization in Automobile Engineering)
211	Mechanical Engineering (with specialization in CAD/CAM & Automation)
212	Production Engineering
213	Textile Technology
215	Electronics & Telecommunication Engineering
214	Mechanical Engineering (with specialization in Mechatronics)
216	Mechanical Engineering (with specialization in Thermal Engineering)
217	Computer Engineering (with specialization in Network Infrastructure Management Systems)
218	Information Technology (with specialization in Software Engineering)
219	Project Management

1. Admissions

Admissions to the first year of all the programmes is made before the start of each academic year as per the procedure finalized by the Competent Authority appointed by Government of Maharashtra state, from time to time. A limited number of students are admitted at the second year of MCA programme under the lateral entry scheme procedure finalized by the Competent Authority appointed by Government of Maharashtra state.

The Institute reserves the right to revoke the admission made to a candidate, if it is found at any time after admission that she/he does not fulfill all the requirements stipulated in the offer of admission.

The Institute also reserves the right to cancel the admission of any student and discontinue her/his studies at any stage of studentship for unsatisfactory academic performance and/or undisciplined conduct.

2. Academic Calendar

The academic activities of the Institute are regulated by Academic Calendar approved by the Chairman, Academic Council and released at the beginning of each year. It is mandatory for students and faculty to strictly adhere to the academic calendar for completion of academic activities. Academic Calendar can be seen on Institute website.(<http://www.vjti.ac.in/>)

3. Attendance

Attendance in the class is compulsory and is monitored every four weeks. The Institute expects 100% attendance. However, due to ill-health or other emergency situations, absence up to 20% is considered on case to case basis on production of documentary proof. In case, attendance of a student falls short by more than 20%, the course instructor shall warn the student in writing every four weeks and keep the Programme coordinator / Head of Department informed. In case of a student whose attendance falls short by more than 20% at the end of a semester, the Department Academic Committee (DAC) shall forward details of the same along with specific recommendation to Dean (Academic Programs) for further action. A student not having 80% attendance is likely to be debarred from appearing in the semester-end examination and given a “RR” grade. Such a student is required to re-register for the same course in a subsequent semester, when the course is offered next. In case a student is unable to attend classes for more than four weeks in a semester, she/he may apply to the Dean (Academic Programs) through Chairman, DAC, for withdrawal from the semester, which shall mean, withdrawal from all the registered courses in the semester. However such application should be made as early as possible and latest before the start of End Semester Examinations. Any application on medical grounds should be accompanied with a medical certificate from a registered medical practitioner containing the registration number of the practitioner.

4. Programme Structure

All students admitted for any of the postgraduate programmes, undergo two year - four-semester studies (three year – six semesters in case of MCA programme). Every programme has a prescribed course structure which in general is termed as the Curriculum. It prescribes all the theory courses, laboratory courses and other requirements for the degree and sets out the nominal sequence semester-wise. It also gives the syllabi and a list of textbooks and reference books for each course.

4.1: Course Credit Structure

In general, a certain quantum of academic work measured in terms of credits is laid down as the requirements for the MCA / M. Tech. degree. A student earns credits by satisfactorily passing courses/carrying out other academic activities every semester. The amount of credits associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credits associated with any of the other activities, is dependent upon the quantum of work expected to be put in for each of the other activity per week.

4.2: Theory and Laboratory Courses

Courses are broadly classified as Theory courses and Laboratory Courses. Theory courses consist of lecture (L) and tutorial (T) hours. Laboratory courses consist of practical hours. Credit(C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of zero point five (0.5) for laboratory hours. Thus, for example, a theory course having two lectures and one tutorial per week throughout the semester carries a credit of 3. Similarly, a laboratory course having three laboratory hours per week throughout semester carries a credit of 1.5. The M.Tech project is carried out in semester III and IV and carries 24 credits, while the MCA project is carried out in semester VI and carries 10 credits. General pattern of the contact hours and credits for a typical semester is as indicated below:

Lecture	Tutorial	Practical	Co-Curricular	Total Hours	Credits
15	-	12	8	35	21

The scheme is prescribed in following format:

Course Name	Hours/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
	L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
Theory Course 1	3	-	-	3	20	20	60	100	3
Theory Course 2	3	-	-	3	20	20	60	100	3
Theory Course 3	3	-	-	3	20	20	60	100	3
Theory Course 4	3	-	-	3	20	20	60	100	3
Theory Course 5	3	-	-	3	20	20	60	100	3
Communications Skills	2	-	-	-	Pass / No Pass				
Total	17		-	15					

Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)			
	L	T	P		TA	ESE (O / P)	Total	ESE (P) (hrs)
Lab Course 1	-	-	3	1.5	50	50	100	-
Lab Course 2	-	-	3	1.5	50	50	100	-
Lab Course 3	-	-	3	1.5	50	50	100	-
Seminar	-	-	3	1.5	25	-	25	-
Total	-	-	12	6				

Course Name	Hour/Week			
	L	T	P	
Industry-Academia Interaction	-	-	2	Attended/Not Attended
E-Library	-	-	2	-
Internet	-	-	2	
Total	-	-	6	

4.3:Project:

Project is a course wherein, under the guidance of a faculty member assigned by the Department, a student is required to do some innovative work with the application of knowledge gained while undergoing various courses in the earlier year. The student is expected to do a survey of literature in the subject, work out a project plan and theoretical analysis, experimental investigation, a proto-type design, analysis of data and development of new relationships, fabrication and set up of new equipment etc. Through the project, the student has to exhibit both the analytical and practical skills.

The M.Tech. project is evaluated in three stages. The first stage and second stage evaluation is done by a committee of institute faculty (at least two faculty members including project guide). The first stage evaluation is done at the end of pre-final semester. The second stage evaluation is

done during the final semester before submission of the synopsis. A committee comprising a minimum of two examiners including the guide and an external examiner carries out the third stage evaluation at the end of final semester.

After the Second stage evaluation, one copy of the synopsis of the project work done and name of external examiner duly endorsed by the DAC is sent to Examination Section for approval of Dean (AP). The student has to submit the Synopsis at least one month prior to the prescribed last date of submission of project report. The student has to submit the Dissertation on or before the prescribed date mentioned in the Academic Calendar. Those students, who are unable to submit by the due date, will have to apply for extension with justification before the last date of submission of synopsis. The guide should forward the application through Head of the Department, with a recommendation of period of extension to Dean (Academic Programs) for final decision on the application.

Student has to submit two soft-bound copies of the dissertation to the Programme Coordinator or a faculty duly authorized by DAC, who will forward the same to the examiners.

After the third stage evaluation, if the Project work is accepted by the Examiners, student should submit one hardbound copy (after making corrections, if any, as suggested by examiners) to the department. This copy is to be maintained in the Department for record. One soft copy on a CD has to be submitted for record of the Central Library.

During the third stage evaluation, 25% weightage shall be given for the initiative, interest, effort and sincerity shown by the student during the entire project work. Another 50% weightage shall be given for the depth of knowledge depicted and level of analytical skills shown in the report and during viva. 25% weightage shall be given to the presentation of report and seminar.

The M.Tech. project carries twenty four (24) credits. The first and second stage assessments carry six (6) credits each. Twelve credits are given to third stage evaluation.

The MCA project is evaluated in a single stage at the end of the final semester. It carries 10 credits.

Students submitting the reports late or those who have to re-submit the report due to fail grades shall be entitled to a maximum grade of BB.

4.4: Seminar

Seminar is a course where in under the guidance of a faculty member, a group of students is expected to survey published technical literature, understand different aspects of the problem

and arrive at a report. While doing a seminar course, the student is expected to critically analyze research work of various authors, learn the investigation methodologies, study concepts, techniques and the results presented in these papers, and present a seminar report. It is mandatory to give a seminar presentation before the seminar guide. Seminars typically carry 1.5 credits.

4.4: Non-Credit Requirement :

All students admitted to first year of the two year M.Tech. programme have to undergo a noncredit course on communication skills in first and second semester of the programme. No credits are awarded for this course, but a PASS (grade of P) in this course is essential for award of the Degree. However, if a student fails to get a PASS (Grade of P) before entering into Second year, the student has to undergo a summer course in Language Laboratory.

5. Examination / Assessment:

5.1: Modes of Evaluation

Semester wise performance assessment of every registered student is done through various modes of examination. These include quizzes, class tests, home assignments, group assignments, viva-voce, Mid-Semester Examination and Semester-End Examination. The Instructor will announce the modes of evaluation and distribution of weightage for each of the assessments at the beginning of the course. Various modes of assessment for theory and laboratory courses along with the recommended relative weightage of various components are given in this section.

5.1.1: Modes of Evaluation for Theory Courses

The Institute follows a continuous evaluation system. A typical theory course evaluation shall have term-work assessment (TA), in-semester tests (IST) and an end-semester examination (ESE). The term-work assessment will be carried out by the course instructor on the basis of at least four components like attendance, quiz, assignments, problems, paper or report on a topic, seminar etc.

For Evaluation against In-semester tests (IST) there will one mid-semester test (MST) and two class tests (one prior and one after the mid semester test). The Mid semester test will carry forty marks and the two class tests will carry ten marks each. Score for In-semester tests will be calculated by giving 33% weightage to both of the class tests together and 67 % weightage to

MST. The weightage assigned to each of the evaluation components for each course is indicated along with the scheme of evaluation. The weightages for term work assessment, in-semester test and end-semester examination for each course is 20:20:60. The course instructor shall continuously grade the performance of the student in various components of the term-work and the student shall be kept informed about the performance. The instructor has to prepare a marks list for the performance of students in the in-semester examination. The test papers will be returned to the students after taking signature of the students on the marks list. Sample copies (at least three) of the term-work of all courses, on the basis of which the term work assessment is done, shall be preserved in the department for a period of at least three academic years. The end semester examination shall cover full syllabus of the course.

Attendance in the end semester examination is compulsory. If a student misses the examination due to personal illness, accident or any untoward incident, student should apply to the Controller of Examinations through the DAC within three days for a permission to appear for next examination. If the student fails to produce the necessary proofs, the student will be deemed to be failed in those courses and will be awarded RR grade. The student shall then be required to repeat the courses. Evaluated end-semester examination answer books shall be preserved by the examination section for a period of at least one academic year.

5.1.2: Modes of Evaluation for Laboratory Courses

The assessment in a laboratory course will be based on turn-to-turn supervision of the student's work, her/his performance in viva-voce examinations and group discussions, the quality of their work as prescribed through laboratory journals and a semester-end practical or oral examination. It is obligatory to maintain a laboratory journal as prescribed by the course instructor. The weightages are 50:50 for term work assessment and end-semester examination.

5.2: Grading

The Institute follows a relative grading system. Based on the combined performance in all assessments, the student is awarded a letter grade in every course taken by her/him in a particular semester as per the curriculum. The grade awarded to a student depends not on her / his absolute performance but her / his performance relative to other students in her / his class. These letter grades not only indicate a qualitative assessment of the student's performance but also carry a quantitative (numeric) equivalent called the Grade Point. The letter grades and their equivalent grade points are given below

Grading Scheme		
Letter Grade	Grade Point	Indicative degree of mastery
AA	10.0	Outstanding
AB	9.0	Excellent
BB	8.0	Very good
BC	7.0	Good
CC	6.0	Satisfactory
CD	5.0	Average
DD	4.0	Marginal
EE	2.0	Unsatisfactory
FF	0.0	Very weak

Letter Grade	Explanation
AU	Audit
PP / NP	Passed / Not Passed
A / NA	Attended / Not Attended
II	In complete due to non-appearance in end semester examination on health grounds.
RR	Fail due to lack of attendance or non-appearance in end semester examination, should repeat the course.
The above grades do not have any grade points associated with them.	

The student passes the course if she/he scores any grade from AA to DD, grades EE and FF being fail grades.

The II (Incomplete) grade is awarded due to non-appearance in end semester examination on health grounds. The student has to appear for the end semester examination for the course when it is conducted next.

The RR grade is awarded if the student fails to have minimum attendance for the classes (including laboratory courses) or if the student fails to attend the end-semester examination without having any valid reasons. Such a student has to repeat that course whenever it is offered again.

A student has to pass a course in not more than three end-semester examinations, including any re-examination conducted for the course. If the student fails to do so, she/he shall have to repeat the course whenever it is offered next.

If a student fails to appear for any of the end-semester examination due to reasons beyond control, the student should inform the Head of the department within three days of start of examination.

A student will have a maximum of three attempts to pass a course. For the second and third attempt, the student's grade sheet will indicate "Passed in second/third attempt"

If a student repeats a course, his grade sheet will indicate "course repeated".

The most recent grade for the course is taken into account for the computation of SPI / CPI. There is no provision for improvement of grades in individual courses.

5.4: Academic Malpractice

Academic malpractices are severely dealt with. In case of malpractice during any evaluation like assignments, quizzes, tests, and examinations, the case should be referred to Unfair Means Committee formed for the purpose. A student shall be suitably punished if the unfair means committee prima facie finds the student has resorted to malpractice or any other unfair means.

5.5: Performance Indices

5.5.1: Semester Performance Index (SPI)

The performance of a student in a semester is indicated by a number called Semester Performance Index, SPI. The SPI is the weighted average of the grade points obtained in all the courses registered by the student during the semester. For example, if a student appears for five courses (Theory/labs./Projects/ etc.) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and her/his grade points in these courses are g₁, g₂, g₃, g₄ and g₅ respectively, then her/his SPI is equal to:

$$SPI = \frac{C_1g_1 + C_2g_2 + C_3g_3 + C_4g_4 + C_5g_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SPI is calculated to two decimal places.

The SPI for any semester will take into consideration the RR/II grades awarded in that semester. For example if a student has failed in course 4 with FF grade, the SPI will then be computed as:

$$SPI = \frac{C_1g_1 + C_2g_2 + C_3g_3 + C_4 * 0 + C_5g_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

5.5.2 Cumulative Performance Index (CPI)

An up to date assessment of the overall performance of a student from the time she/he entered the Institute is obtained by calculating a number called the Cumulative Performance Index, CPI, in a manner similar to the calculation of SPI. The CPI therefore considers all the courses registered by the student, towards the minimum requirement of the degree she/he has enrolled for, since she/he entered the Institute. The CPI is calculated at the end of every semester to one decimal place and is indicated in semester grade reports. In the semester where the student has failed in course(s), her/his grade sheet will not indicate any CPI.

A CPI of 6.75 or above will be considered as equivalent to First Class (60%) of similar programmes of the University. The institute may issue a separate certificate mentioning first class to only those candidates acquiring CPI 6.75 or above.

6. Programme duration

A student of two year post graduate degree programme who fails to graduate within three years from date of admission to programme shall be terminated from the programme. A student of three year post graduate degree who fails to graduate within five years from date of admission to programme shall be terminated from the programme.

7. Promotion to next year for PG Programme

7.1: M.Tech.

A student will be promoted and allowed to register for the Second year if she/he has acquired minimum of 36 credits in first year. A student who fails to earn a CPI of 5.0 at the end of first year has to repeat the course/s in which she / he has failed or earned a grade of 'DD', provided the course/s is offered, on the recommendation of DAC and approval of Dean (AP).

7.2: MCA

A student will be promoted and allowed to register for the Second year if she/he has acquired minimum of 36 credits in first year. A student will be promoted and allowed to register for the Third year if she/he has cleared all courses of the first year and acquired minimum of 36 credits in second year. A student who fails to earn a CPI of 5.0 at the end of first year / second year / third year, has to repeat the course/s in which she / he has failed or earned a grade of 'DD', provided the course/s is offered, on the recommendation of DAC and approval of Dean(AP).

8. Eligibility for the Award of Degree

The names of the students who satisfy below mentioned requirements shall be forwarded to the University of Mumbai for award of MCA or M. Tech. in the relevant discipline.

- The student should have studied and passed all the courses and acquired necessary number of credits as per the requirements of a particular degree programme and as prescribed by the Institute from time to time within the stipulated time from date of first registration to programme.
- The student should have paid all the Institute and University dues including the dues of Department, Hostels, Library and other units.
- Obtained a CPI of atleast 5.00 at the end of the semester in which she/he completes all the requirements for the award of Degree;
- No case or disciplinary action is pending against her/him.

9. Improvement in CPI

9.1: M.Tech Programme

If a student has graduated, but wishes to improve her / his CPI, she / he will have to appear for end semester examination of atleast two courses of Semester I and Semester II within two years of graduation by paying the required examination fees. Only one attempt is provided for such improvement. The result of such examination will be declared only if there is improvement in CPI over earlier CPI.

9.2 MCA Programme

If a student has graduated, but wishes to improve her / his CPI, she / he will have to appear for end semester examination of atleast three courses (except for the project) of Semester IV and Semester V within two years of graduation by paying the required examination fees. Only one attempt is provided for such improvement. The result of such examination will be declared only if there is improvement in CPI over earlier CPI.

Annexure III

VEERMATAJIJABAITECHNOLOGICALINSTITUTE

(Autonomous Institute affiliated to University of Mumbai)

Manual of Rules

For

Doctor of Philosophy
(Technology) Programmes

in

- 901 Civil Engineering
- 902 Mechanical Engineering
- 903 Electrical Engineering
- 904 Production Engineering
- 905 Textile Technology
- 906 Electronics Engineering
- 907 Computer Engineering

To be implemented from the batch admitted in Academic Year 2013-14

INTRODUCTION

This manual sets out the rules, procedures and requirements of the Doctor of Philosophy (Technology) programmes that fall under the purview of Academic Council of VJTI.

The rules and regulations described in this manual are applicable to the programmes listed below:

- 901 Civil Engineering
- 902 Mechanical Engineering
- 903 Electrical Engineering
- 904 Production Engineering
- 905 Textile Technology
- 906 Electronics Engineering
- 907 Computer Engineering

1 Eligibility for Admission

- 1.1 A candidate shall be considered eligible for registration for the degree of Ph.D. provided that the candidate satisfies **one** of the following:
- i) Candidate must have obtained Bachelor's degree and Master's degree in technology or engineering with minimum 60% marks (*55% marks in case of reserved category*) in either of the two or a CPI/CGPA of 6.75 or above on a 10 point scale (*CPI/CGPA of 6.25 or above on a 10 point scale in case of reserved category*)
 - ii) Candidate who is currently an approved teacher having approved full time teaching experience of at least FIVE years.
 - iii) A candidate from a research organization or industry is considered eligible for registration for the degree of Ph.D. provided that the candidate satisfies the following:
 - a) Having obtained Bachelor's degree and Master's degree in technology or engineering.
 - b) Having THREE years technical/ industrial experience in the field of interest.
 - c) Having visibility/acceptability of his/her work by way of paper presentations in reputed conferences, peer reviewed journals and/or research project completion in the field of interest.
 - d) Having sponsorship from the parent organization. (Candidate shall submit a sponsorship letter from the parent organization in the prescribed format)

Such Candidates will preferably be selected for a joint research project from sponsoring organization. Infrastructural and financial support will come from the sponsoring organization (with Memorandum of Understanding between the sponsoring organization and VJTI). Supervision will be jointly done by a faculty from the institute and a person qualified to supervise Ph.D. work from the sponsoring research organization/industry.

2 Selection process

- 2.1 The candidate has to undergo a written test as per the UGC norms for Ph. D. program in the concerned department.
- 2.2 Department shall provide candidates with the details of research areas in the department.

- 2.3 The eligible candidates will have to undergo an interview by a panel formed for the purpose, including Head of the department and all eligible research guides in the department.
- 2.4 The final recommendations of the department will be forwarded through respective Departmental Academic Committee (DAC) to Dean (Academic Programmes) for final approval of Director / Chairman Academic Council.
- 2.5 After approval process, the candidate will be informed regarding selection and shall be offered registration to Ph. D. program of the Institute after payment of necessary fees within stipulated time. If candidate fails to accept the offer of admission within a specified time limit, the offer of registration shall stand cancelled and the candidate will have no claim afterwards.
- 2.6 Candidate has to prepare an outline of the proposed research work in consultation with the supervisor/s and submit the same to respective DAC within a maximum period of nine months from the date of registration. Completion of course work of 9 credits with a CPI of 6.0 & above and approval of the proposal by the PhD affairs committee is must for further continuation of the PhD registration.

3 Exemption from the Written Test

- 3.1 A candidate who has appeared for the PhD entrance test (PET) of University of Mumbai and has **valid PET score** is exempted from the written examination for Ph.D., conducted by the departments.
- 3.2 A candidate with valid GATE score in the relevant field is exempted from the written examination for PhD, conducted by the department.
- 3.3 Approved teachers appointed in the University of Mumbai or its affiliated colleges having not less than Five years, full time continuous teaching experience after the date of First approval of appointment shall be exempted from the written examination for PhD, conducted by the department. The copy of approval letter has to be attached as proof along with application.

4 Categories of Ph. D. candidates

The Institute admits Ph. D. candidates under following categories:

4.1 Full-time research scholar

Candidate is required to be available in the institute full time for period of atleast three years. There is possibility of Research / Teaching assistantship available to the candidate from institute funds or research projects. Candidates sponsored by their parent organizations cannot avail of Research / Teaching assistantship. Sponsored candidates have to produce sponsorship letter in given format along with application form.

4.2 Part-time research scholar

Candidate is required to complete at least two semester of residential requirement at the institute. Sponsored candidates have to produce sponsorship letter in given format along with application form. Institute internal candidates have to apply as part time research scholars only. Internal candidates have to work under VJTI supervisor and/or external supervisor from IIT or other research organizations (optional with recommendation from DAC).

5 Course credit requirements

- 5.1 All research scholars registering for PhD programme are required to acquire minimum of 09 credits from amongst M Tech level courses (03 theory courses including Research Methodology course) within first two semesters after registration.
- 5.3 The course on research methodology is compulsory for all the research scholars admitted in the Institute.
- 5.4 The courses may also be taken from other departments of VJTI or from IIT or other reputed institutes, with whom VJTI has MOU, on the advice of the supervisor(s) and recommendation of respective DAC. (*Internal research scholars must register for the courses in IIT.*)
- 5.5 Every registered scholar will have to deliver a seminar by studying at least five quality research papers in the chosen field of interest as suggested by the supervisor, which will be evaluated by a committee of three faculty members who are research supervisors, and satisfactory performance is must for further continuance of registration.
- 5.6 The research scholar should acquire a minimum CPI of 6.0 in the registered courses for further continuation in the PhD programme. The research scholar who fails to satisfy the requirement of minimum CPI of 6.0 within first year of admission has to discontinue the programme.

6 Evaluation and assessment

- 6.1 The DAC will form at least a three member Research Progress Committee (RPC) for every research scholar. RPC shall consist of members, who are conversant with the field of research and shall include;
 - Supervisor/s,
 - Internal faculty of VJTI having knowledge of the research area
 - External member from IIT or other institutes / organizations of repute

The names of RPC members along with the courses to be completed by the research scholar shall be communicated to PAC through Dean (AP) within nine months of provisional admission to the programme.

- 6.2 The research scholar has to submit progress report through Supervisor, to the RPC at the end of every year.
- 6.3 At the end of every year, the research scholar will present his research work in an Annual Progress Seminar (APS) to the RPC, postgraduate students and faculty. Such seminars are required to be given every year until the submission of synopsis. Further, the research scholar has to mandatorily participate in the annual VJTI Ph.D. Colloquium and present his research in form of a poster presentation, to the satisfaction of evaluators.
- 6.4 The RPC will monitor the progress of research work of the candidate until completion of the programme.
- 6.5 The continuation of registration of scholar is subject to satisfactory progress and recommendation of respective RPC on annual basis.
- 6.6 The delay in submission of progress report and presentation may lead to discontinuation of Institute assistantship or/and cancellation of registration for the program.
- 6.7 The research scholar has to give atleast three Annual Progress Seminars. The RPC, in the third or any subsequent APS will decide whether the scholar has completed research work to an extent that his pre-synopsis seminar can be held and note its recommendations in the APS report.
- 6.8 The research scholar during the pre-synopsis seminar has to present her / his complete

research work and include all suggestions of the RPC in the final thesis. The final thesis has to be submitted within three months of the pre-synopsis seminar.

- 6.9 The thesis submitted by the research scholar will be evaluated by at least three external referees. At least two referees have to recommend acceptance of thesis with or without corrections / modifications. Finally the research scholar has to undergo a comprehensive viva voce examination which has to be openly defended. The committee of examiners for the open defence shall consist of one of the external referees, the supervisor and the Head of Department / professor, who will work as Chairman of the committee. After successful defence of the comprehensive viva voce, the name of the research scholar shall be communicated to the University of Mumbai for award of Doctor of Philosophy (Technology) degree in the concerned discipline of engineering.
- 6.10 If two of the referees recommend not acceptance of thesis, the RPC will meet to review the reports submitted by the referees and in tune with the reports, instruct the research scholar to modify the thesis in line with the reports of the referees. The RPC may instruct the research scholar to carry out further work also. The modified thesis is resubmitted to the referees. If the two of the referees still recommend non acceptance of thesis, the candidature of the research scholar will be terminated.

7 Award of degree

- 7.1 All full time research scholars have to work for a minimum period of three calendar years from the date of registration before submission of thesis, while all part time research scholars, including internal research scholars, have to work for a minimum period of four calendar years from the date of registration before submission of thesis.
- 7.2 The validity of registration of the research scholar is Six calendar years.
- 7.3 A research scholar will not be permitted to submit a thesis, a work for which a degree or diploma or any other academic award has been conferred on the candidate by any university / academic body.
- 7.4 A research scholar will be permitted to submit a thesis, only if the research scholar has to his credit at least one journal paper in a journal of repute having reasonable impact factor and at least one conference paper in a conference organized by IITs / NITs / reputed engineering colleges / reputed professional societies.

Annexure IV

Scheme of Teaching and Evaluation
M Tech. (Project Management) (Semester I)

Theory Courses										
Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (hrs)
PE0375	Principles of Project Management	3	-	2	3-0-1	20	20	60	100	3
PE0376	Elements of Industrial Engineering	3	2	-	3-1-0	20	20	60	100	3
PE0377	Public Administration	3	-	-	3-0-0	20	20	60	100	3
PE0378	Managerial Accounting, Costing & Project Finance	4	2	-	4-1-0	20	20	60	100	3
PE0379	Quantitative techniques for Project Management.	4	-	2	4-0-1	20	20	60	100	3
CC4341	Professional Communication & Ethics	-	-	2	P/NP					
CC4342	Constitution of India	-	2	-	P/NP					
	Total	17	6	6	21					

Total for Semester I	L	T	P	Total Hours	Credits
	17	6	6	29	21

Scheme of Teaching and Evaluation
M Tech. (Project Management) (Semester II)

Theory Courses										
Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (hrs)
PE0380	Research Methodology	3	2	-	3-1-0	20	20	60	100	3
PE0381	Infrastructure Management	3	-	-	3-0-0	20	20	60	100	3
CE0457	Project Risk Management	3	2	-	3-1-0	20	20	60	100	3
PE0383	Organizational Behavior & Human Resource Management	3	-	-	3-0-0	20	20	60	100	3
	Elective-I	3	-	-	3-0-0	20	20	60	100	3
	Elective-II	3	-	-	3-0-0	20	20	60	100	3
CC4343	Intellectual Property Rights	-	2	-	P/NP					
CC4344	Commercial Laws	-	2	-	P/NP					
	Total	18	8	-	20					

Total for Semester II	L	T	P	Total Hours	Credits
	18	8	0	26	20

Summer Term (Summer Vacation May-June-July)

Course Code	Course Name	Credits	Duration
PE1361	Industry/Business/Academia Internship/Minor Project Work	4	4 Weeks

Scheme of Teaching and Evaluation
M Tech (Project Management) (Semester III)

Theory Courses										
Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (hrs)
	Elective-III	3	-	-	3-0-0	20	20	60	100	3
	Elective-IV	3	-	-	3-0-0	20	20	60	100	3
PE3351	Stage –I Presentation	-	-	-	6					
	Total	6	-	-	12					

M Tech (Project Management) (Semester IV)

Course Code	Course Name	Credits
PE3352	Stage –II Presentation	6
PE3353	Presentation and Viva Voce	12
	Total	18

Elective Courses

Elective Courses for Semester II	
Course Code	Course Name
PE0384	Sustainable Manufacturing & Supply Chain Management Operations
PE0385	Operations Strategy
PE0386	Maintenance Engineering & Management
PE0387	Materials Management
PE0388	Managerial Economics
PE0389	Total Quality Management
PE0390	Facilities Planning & Design
PE0391	Occupational safety, health & environment
PE0321	Advanced Operations Research
PE0392	Technology Management
PE0393	Ecology and Sustainable Development

Elective Courses for Semester III	
Course Code	Course Name
CE0353	Environmental Impact Assessment & Audit
PE0394	Innovation, Entrepreneurship & Business Transformation
PE0395	Marketing Management
PE0396	MIS & Enterprise Resource Planning
PE0397	Operations Management
PE0357	World Class Manufacturing
CE0457	Disaster Management

PE 0398	Software Project Management
PE0399	International Business
CE 0451	Risk & Value Management
Abbreviations: L: Lectures, T: Tutorial, P: Practical, TA: Teacher Assessment, IST: In Semester Test/s, MST: Mid Semester Test, P/NP: Pass/Not Pass	

Principles of Project Management

Course Code	Theory Course Name	L	T	P	Credits	TW A	IS T	ES E	Total	ESE Hours
PE0375	Principles of Project Management	3	-	2	3-0-1	20	20	60	100	03

Course objectives:-

- To understand the basic concepts of project management.
- Appraise the project using appropriate appraisal techniques.
- Design and implement project by considering risk and its evaluation.
- Learn the process of project planning and execution.

CONTENT:-

Introduction to Project Management: What is a project? Evolution of project management, the need of project management, Where is project management appropriate? Characteristics of projects, Characteristics of project management, Projects in contemporary organizations, Project life cycle.

Project Selection and Appraisal: Brainstorming and concept evolution, Project selection and evaluation, Selection criteria and models, Types of appraisals, SWOT analysis, Cash flow analysis, Payback period, and Net present value.

Project Organization and Planning: Project manager, Cross-functional team, Dedicated project organization, Influence project organization, Matrix organization, Advantages and disadvantages of project organizations, Selection of project organization, Work Breakdown Structure (WBS), Integration of project organization and WBS, WBS and responsibility matrix.

Project Scheduling and Resource Management: Gantt chart, Milestone chart, Network techniques: PERT and CPM, AON and AOA representation, Three time estimates, Using probability distributions for time computation, Probability of project completion, Time scale version of network, Early start and late start schedules, Resource allocation, Resource loading and leveling, Constrained resource scheduling, Multi-project scheduling and resource allocation, Crashing a project.

Computerized PM: Computerized PMIS, Choosing software for project management, using software for project management.

Case Studies on Project Management: Modern cases in project management.

Reference Books:-

1. Project Management for Business and technology: Principles and Practice, John M. Nicholas, Pearson Prentice Hall, New Delhi, 2005.
2. A Guide to the Project management Body of Knowledge (PMBOK Guide) 5th Edition, PMI.
3. Project Management-Case Studies, Harold Kerzner, John Wiley & Sons, New Jersey, 2006.
4. Project and Production Management, A course by National Programme on Technology Enhanced Learning (NPTEL), Arun Kanda and S. G. Deshmukh, IIT Delhi, 2005.
5. Projects: Preparation, Appraisal, Budgeting and Implementation, Prasanna Chandra, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1980.

Elements of Industrial Engineering

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0376	Elements of Industrial Engineering	3	2	-	3-1-0	20	20	60	100	03

Course objectives:

- Deepen the insights in the field of work study, ergonomics, productivity improvement techniques, quality engineering.
- Impart skills to apply techniques to enhance work environment, quality and productivity.
- Impart advanced knowledge in these areas through study of research papers to enable the students to undertake research and projects in these areas.
- Provide computational skill in using related software.

CONTENT:-

Fundamentals of Industrial Engg:- Productivity Vs Quality, Total productivity & Quality Management, Relationship with Standard of living, Maslow's Theory of Hierarchy of needs

Method Study: Concept, significance, procedure, applications, case studies.

Work measurement: Work sampling, Time study, MOST

Ergonomics: Concept, significance, man/machine/environment systems concept, development of ergonomics, Design approach, Controls, Work load, Climate, applications, case studies on ergonomics.

Plant Location: Concept, Significance, Factors affecting plant location, Location Economics

Plant Layout: Concept, significance, Types of Plant layout, methods for design of layouts, etc

Fundamentals of Material Handling

Advanced techniques of Industrial Engineering:- Just in Time, Concurrent Engineering, SMED, Kaizen, Business Process Reengineering, Supply Chain Management, Value Engineering, Lean Thinking, Visual Workplace, Poka-Yoke, Strategic Human Resource Management, Total Productive Maintenance

Reference Books:-

1. Introduction to Work Study & Ergonomics, George Kanawaty, International Labor Organization, 1992.
2. Work Study and Ergonomics, Shan H.S., Dhanpat Rai & Sons, 1999.

Public Administration

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0377	Public Administration	03	-	-	3-0-0	20	20	60	100	03

Course objectives:-

- Provide understanding of administrative concept, constructs and theory, administrative thoughts, organization structure and functioning, administrative law.
- Developing insights in the functioning of public and private organizations, leadership and motivation theory for effective handling of organizations.

CONTENT:-

Administrative Theory

Introduction: Meaning, scope and significance of Public Administration; Evolution of the discipline and its present status; New Public Administration; Challenges of liberalization, Privatization, Globalization; Good Governance: concept and application.

Administrative Thought: -Scientific Management; Classical Theory; Weber's bureaucratic model; Human Relations School (Elton Mayo and others); Simon's decision-making theory; Participative Management (R. Likert, C. Argyris, D. McGregor).

Administrative Behaviour: -Process and techniques of decision-making, Communication; Morale; Motivation Theories – content, process and contemporary; Theories of Leadership: Traditional and Modern.

Organizations:- Theories – systems, contingency; Structure and forms: Ministries and Departments, Corporations, Companies, Boards and Commissions; Ad hoc and advisory bodies; Headquarters and Field relationships; Regulatory Authorities; Public - Private Partnerships.

Accountability and control:- Concepts of accountability and control; Legislative, Executive and Judicial control over administration; Citizen and Administration; Role of media, interest groups, voluntary organizations; Civil society; Citizen's Charters; Right to Information; Social audit.

Financial Administration: -Monetary and fiscal policies; Public borrowings and public debt Budgets - types and forms; Budgetary process; Financial accountability; Accounts and audit.

Administrative Law:- Meaning, scope and significance; Dicey on Administrative law; Delegated legislation; Administrative Tribunals.

Development Administration: -Concept of development; Regulatory and development administration; Changing profile of development administration; Bureaucracy and development;

Strong state versus the market debate; Impact of liberalization on administration in developing countries;

Personnel Administration:- Recruitment, discipline, performance appraisal, promotion, pay and service conditions; employer-employee relations, grievance redressal mechanism; Code of conduct; Administrative ethics.

Public Policy:- Models of policy-making and their critique; Processes of conceptualization, planning, implementation, monitoring, evaluation and review and their limitations; State theories and public policy formulation.

Reference Books:-

1. Indian Administration - Ramesh K. Arora & Rajni Goyal.
2. Indian Administration - S.R. Maheswari.
3. Administrative Theory - Avasti & Avasti
4. Public Administration - Avasti & Maheswari.
5. Administrative Thinkers - S.R. Maheswari.
6. Public Administration - Sadhna and Sharma
7. New Horizons of Public Administration - Mohit
Bhattacharya.
8. Public Administration Theory and concepts -
Rumki Basu
9. Indian Constitution - D.D. Basu

Managerial Accounting, Costing & Project Finance

Course Code	Theory Course Name	L	T	P	Credits	TW A	IS T	ES E	Total	ESE Hours
PE0378	Managerial Accounting, Costing & Project Finance	4	2	-	4-1-0	20	20	60	100	03

Course objectives: -

- Provide literacy and proficiency in management accounting, costing, cost control and finance especially project and infrastructure finance.
- Impart proficiency in costing, cost control methods, reading and analyzing financial statements.
- Impart advanced knowledge in the field acquisition and rationing project funding and budgetary control.
- Application of computer software and methods to these topics.

CONTENT:-

Managerial Accounting:- Financial statements; assets, liabilities, capital, profit, income, expenses. Accounting concepts; Fixed and current assets, short and long term liabilities, reserves and owners funds. Accounting for income and expenses, cash v/s accrual basis, capital and revenue expenditure, capital and operating income, deferred revenue expenditure; depreciation, depletion and amortization; accounting for fictitious assets and obsolescence, impact of exchange rate variations on corporate financial statements. Mechanics of accounting; ledger and trial balance based on double entry book keeping. Provision in company law and other legal aspects. Balance sheets, profits and loss statements, annual reports of business enterprises.

Costing: - Operating cost; definition, cost of production, cost of sale, labor and material costs, other expenses, variation in elements of operating cost with capacity, production rate; total cost, unit cost, fixed and variable expenses. Cost ascertainment; allocation, apportionment, absorption of overheads and non-production cost; overhead analysis, absorption methods, general considerations. Job costing; factory job costing, contract cost. Unit costing; output and operating cost, simple process costing, normal and abnormal losses in process, waste, scrap, bye-and joint products. Marginal costs and breakdown charges. Cost planning and control, standard cost and budgetary control, setting standards, variance analysis. Cost reduction; tools, techniques and productivity. Depreciation; causes and significance, methods of providing for depreciation, book values, taxes and depreciation. Investments; fixed cost v/s varying capacity, unit cost v/s varying capacity. Comparison of alternatives; selection in present economy, accepting or nor accepting a single alternative of providing equal / unequal services, unequal first cost and unequal lives, evaluation of replacement. Techniques for comparing alternatives; payout periods, rate of return, discounting methods, minimum acceptable rate, net present value, yield, annual capital charge, cash flow, profit incremental discounted cash flow (DCF) returns.

Project Finance:-Contours of finance function in business, goal of finance, profit maximization and others. Sources of finance and their relative importance. PPP arrangements in project finance, Fund allocation, alternative uses of finance. Capital budgeting; need, uses, limitations. Assessment of capital needs; short and long term capital expenditure, project appraisal. Budgetary control; concept, types of budget. Financial markets; money markets, bill market, discount houses, call loan market, etc., Capital markets; mutual funds, stock markets, industrial banks, world bank, UTI, IDBI, ICICI, and state finance corporations. Corporate planning;

taxation and other financial incentives, objectives of corporate planning, capital expenditure and financial management, financial statements, fund flow and cash flow analysis.

Reference Books:

1. Management Accounting, M.Y.Khan, P.K.Jain, TMH, 2012
2. Financial Management, I.M.Pandey, Vikas Publication House, 2006
3. Accounting for Management Text & Cases, Bhattacharya S.K., Vikas Publishing House, 2010
4. Fundamentals of Financial Management, Text and Cases Prasanna Chandra, TMH, 2010
5. Managerial Economics, Varshney and Maheshwari, Sultan Chand and Sons, New Delhi. 2011

Quantitative techniques in Project Management

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0379	Quantitative techniques in Project Management	4	-	2	4-0-1	20	20	60	100	03

Course objectives: To enable in understanding the project management science techniques with modern technological solutions and apply quantitative analysis to different types of organizational decision making situations.

CONTENT:-

Project Management overview:- Framework for conceiving, planning, executing and closing projects; Project views of the stakeholders; typical project examples in new product development, manufacturing, services, construction, IT and infrastructure.

Analysis of projects:- Objectives and success criteria- both financial and non financial measures; Capital Budgeting ,Break even analysis, Project evaluation and selection methods using multiple attributes -economic and operation analysis; Decision tree, AHP and Utility theory. Concepts and applications of Work Breakdown Structure (WBS)- Network analysis for time management using CPM, PERT, Crashing and Simulation.

Project Resource Management:- Allocation, Leveling and Smoothing methods; Multi project and multi resource , multi mode scheduling under various constraints- limited resources, limited budget, non-split, start / end lag; Application of Heuristics, Mathematical programming , Evolutionary algorithms such as GA, Application of knowledge-based systems.

Managing Project Risks:- Identification, Assessment and Mitigation. Application of Probability Tree, and Decision Tree and Decision Table for risk management. Application of theory of constraints and critical chain method for planning and controlling a project; role of buffers.

Earned value concept in project control:- Calculation of Schedule and Cost Variances, Quality management through statistical tools and Cause and Effect Analysis

Reference Books:-

1. Project Management: A Managerial Approach, Meredith, J. R. and Mantel Jr., S. J., John Wiley, New York. 2004
2. Quantitative Methods in Project Management, Good pasture, J. C., J Ross Publishing, Boca Raton, Florida, USA. 2003
3. Project Management for Business and Technology: Principles and Practice, Nicholas, J. M.,Prentice Hall India, New Delhi. 2010
4. Project Management: Engineering, Technology and Implementation, Shtub, A., Bard, J. F. and Globerson, S., Prentice Hall, Englewood Cliffs, USA. 1994
5. A Guide to the Project Management Body of Knowledge, Project Management Institute, Newtown Square, Pennsylvania, USA. 2000
6. Project Management: A Systems approach to Planning, Scheduling and Controlling, Kerzner, H., John Wiley, New York. 1998
7. Critical Chain Goldratt, E. M., North River Press, Great Barrington, MA, USA. 1997

Professional Communication & Ethics

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
CC4341	Professional Communication & Ethics	-	-	2	P/NP	-	-	-	-	-

Course objectives: To understand the principles of professional communication and ethics for effective project manager's role in the organization.

CONTENT:-

Professional Communication – Principles of Communication, Verbal Communication, Written Communication, Report Writing, Internal Communication, External Communication, Basics of Business communication, Meaning and importance of communication in business, barriers of communication, Process for drafting Effective Business Message; Letter writing: Good news, Bad news, Informative news, Persuasive news; Memorandum drafting; E-mail writing; Report writing – Short & Long Formal Reports.

Presentation strategies, Strategies to improve - reading skills, speaking skills, listening skills; Guidelines to effective public speaking; Developing job application – Covering letter, Resume; Interviewing: Negotiating the job offer.

Handling Business Information – Annual Report, House Magazine, Press Release, Press Report. Group Communication: Introduction, Group Discussion, Organizational Group discussion, Group discussion as part of selection process.

Research paper, Dissertation and Thesis writing.

Business Ethics:-

What is Ethics, Nature and scope of Ethics, Facts and value, Ethical subjectivism and Relativism, Moral Development (Kohlberg's 6 stages of Moral Development), Ethics and Business, Myth of a moral business.

Decision making (Normal Dilemmas and Problems): Application of Ethical theories in Business

(i) Utilitarianism, (ii) Deontology Virtue Ethics.

Economic Justice: Distributive Justice, John Rawls Libertarian Justice

Ethical Issues in Functional Areas of Business.

Characteristics of Free and Perfect competitive market, Monopoly oligopoly, Ethics in Advertising (Truth in Advertising).

Finance: Fairness and Efficiency in Financial Market, Insider Trading, Green Mail.

HR: Workers Right and Duties: Work place safety, sexual harassment, whistle blowing.

Reference Books:-

1. Technical Communication – Principles and Practices, Meenakshi Raman and Sangeeta Sharma, Oxford University Press, 2004.
2. Ethics in Information Technology, George Reynolds, Thomson Course Technology, 2003.
3. Effective Technical Communication by M Ashraf Rizivi, Tata Magraw Hill, 2005
4. Ethics in Engineering by Mile W Martin and Ronald Schinzinger, Tata Magraw Hill, 2003

Constitution of India

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
CC4342	Constitution of India	-	2	-	P/NP	-	-	-	-	-

Course Objective:- To provide overview of constitution of India.

CONTENT:-

- Introduction to Indian Constitution and its salient features.
- Fundamental Rights and their significance.
- Definition of the State under Art.12.
- Dimensions of Article 13.
- Right to equality and protective discrimination – Articles 14,15 & 16.
- Fundamental freedoms – Art. 19 and Reasonable restrictions
- Right against exploitation – Articles 23,24
- Doctrine of Double jeopardy, self-incrimination and ex-post facto laws –
- Article 20
- Right to life and personal liberty – Art.21
- Preventive Detention and Constitutional safeguards – Art.22
- Freedom of Religion – Art. 25,26,27,28
- Cultural and Educational Rights – Art. 29-30
- Right to Constitutional Remedies – Articles 32, 226 and concept of Public Interest
- Litigation.
- Directive Principles of State Policy, their significance and relationship with
- Fundamental Rights including Directive Principle's under constitution of J&K.

Reference Books:-

1. V.N. Shukla's: Constitution of India (Ed. By M.P. Singh).
2. M.P. Jain: Indian Constitutional Law.
3. M. Hidayatullah (Ed.): Constitutional Law of India.
4. D.D. Basu: Shorter Constitution of India.
5. H.M. Seervai: Constitutional Law of India.
6. Brij Kumar Sharma Introduction to the Constitution of India.
7. Justice A.S. Anand: The Constitution of J&K:Its Development & commentsCommercial laws.

Research Methodology

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0380	Research Methodology	3	2	-	3-1-0	20	20	60	100	03

Course objectives: -

- Impart fundamentals of concepts, construct, theory, research, research methodology-(methods ,techniques ,tools)
- Develop capability to undertake empirical and quantitative research using scientific methods.
- Impart knowledge of selecting and using relevant statistical methods in research.
- Develop capability in using quantitative methods with software.
- Provide knowledge and skill in writing technical reports in standard format.

CONTENT:-

Introduction of Research Methodology: Meaning and purpose of research, objectives of research, types of research, significance of research, Research Approaches, Research Methods v/s Methodology, Research Process, Criteria of Good Research. Research and Scientific Methods problems encountered by researchers in India.

Research Problem: Steps in Research: Identification, selection and formulation of research problem- Research questions-Research design- Formulation of hypothesis- Review of literature. Definition, necessity and techniques of defining research problem; Formulation of research problem; Objectives of research problem.

Research Design: Meaning need and features of good research design. Types of Research Designs, Basic Principles of Experimental Designs; Design of experiments.

Sampling Designs and Technique: Sampling theory-Types of sampling-Steps in sampling- Sampling and Non-sampling error-Sample size –Advantages and limitations of sampling. Census and Sample surveys, Different types of sample designs, characteristics of good sample design. Techniques of selecting a random sample.

Data Collection: Primary and secondary data. Primary data-Meaning, Collection methods- Observation – Interview-Questionnaire-Schedule-Pretest-Pilot study –Experimental and case studies- Secondary data- Meaning – Relevance, limitations and cautions.

Hypothesis: Definition, Fundamentals and procedure of hypothesis testing, flow diagram for hypothesis testing. Measurement in Research: Measurement scales – Tests of good measurement construction of Likert and Semantic Differential scales-Source of errors in measurement- Scale validation. Parametric and non-parametric tests of hypothesis testing-Important non-parametric tests: Sign, Run Kruskal-Wallis tests and Mann – Whitney test.

Parametric Tests: Testing of significance mean, proportion, variance and correlation- Testing for significance of difference between means, proportions, variances and correlation coefficients. Limitations of tests of hypothesis

ANOVA and Chi-Square Tests: One-way and two-way ANOVA – Latin Square tests for association and goodness of fit.

Technical Paper and Report Writing: Basic concepts of paper writing and report writing, review of literature, Concepts of Bibliography and References, significance of report writing, steps of report writing, Types of Research reports, Methods of presentation of report.

Process and Structuring the Report: Types of reports, Contents, Styles of reporting, Steps in drafting reports, Chapter format, Pagination, Identification, Using quotations, Presenting

footnotes – abbreviations, Presentation of tables and figures, Referencing, Documentation, Use and format of appendices- Indexing Editing and evaluating the final draft.

Research ethics: Ethical Issues, Ethical Principles that govern Research, Ethically valid Information Sources, Regulatory Compliance.

Reference Books:-

1. Research Methodology: R. Panneerselvam, Prentice Hall Publication ,2004
2. Research Methodology: Methods and Techniques by C. R. Kothari New Age International Publishing, second edition.
3. Statistical Methods for Research Workers , Fisher R. A. Macmillan Pub Co, 1970
4. Design and Analysis of Experiments, Montgomery D.C. John Wiley, 2001

Infrastructure Management

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0381	Infrastructure Management	3	-	-	3-0-0	20	20	60	100	03

Course objectives:- To understand the basic s of Infrastructure management and it's significance for effective project manager's role in the organization.

CONTENT:-

Project report preparation:-Basic study, investigations and feasibility studies, project formulation, SWOT analysis, project report.

Appraisal:- What is an infrastructure project, project development cycle, what is appraisal, Need of appraisal, steps of appraisal.

Market appraisal:- Demand analysis, forecasting demand, sources of information, market survey, uncertainties in demand forecasting.

Management appraisal:- Assessment of entrepreneur, chief executive, board of directors, departmental heads, organization as a whole.

Technical appraisal:- Location, land, buildings, technology and its appropriateness, size of plant, plant and machinery, raw materials, energy requirements, water supply, effluent disposal.

Financial and economic appraisal:- Cost of project, means of financing, profitability, break-even analysis, financial projections, financial appraisal tools: urgency, payback period, accounting rate of return, net present value, internal rate of return, benefit cost ratio, cost of capital, risk analysis, social cost benefit analysis.

Ecological appraisal:- Environmental impact analysis.

Project implementation:- Agencies involved in implementation, methods of implementation like Build, operate and transfer (BOT) method and its variants like BOO, BOOT, BOLT etc.

Project financing:- Types and sources (local and international)

Reference Book:-

Project Preparation, Appraisal, Budgeting, and Implementation: Prasanna Chandra, Tata McGraw Hill.

Project Risk Management

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
CE0457	Project Risk Management	03	-	-	3-0-0	20	20	60	100	03

Course objectives:- To understand the basics of project risk management.

CONTENT:-

Risks:- Definition, dynamic and static risk, uncertainty and risk.

Risk and construction:- Time, money and technology, the people and the risks, processes and risks, risks and clients, consultants and contractors, decision making in construction, contracts and risks.

Risk management system:- Risk identification, sources of risks, risk classification, types, impact and consequences of risk, risk analysis, scenario analysis, risk response: retention, reduction, transfer, avoidance.

Tools and techniques of risk management:- Risk adjusted discount rate, subjective probabilities, decision analysis, multi-attribute value theory, sensitivity analysis, Monte-carlo simulation, portfolio theory.

Utility and risk attitude:- Utility theory, utility function.

Risk analysis of single projects:- Risk measures, analysis of un-correlated, perfectly correlated and moderately correlated cash flows, sensitivity analysis, simulation analysis, decision tree analysis. Risk analysis in practice.

Disasters:- Natural and manmade, possible effects, identifying critical processes and systems.

Disaster recovery plan:- Basic requirements, documenting disaster recovery plan, rehearsing the disaster recovery plan, example disaster recovery plan.

Reference Books:-

1. N J Smith , Managing Risk in Construction Projects.
2. L W Zimmerman and G D Hart, value Engineering, CBS Publishers.
3. R Flagnan R and G Norman, Risk management and Construction, Blackwell Scientific.
4. Thompson P A and Perry J G, Engineering Construction Risks- A guide to Project risk analysis and risk management, Thomas Telford

Organizational Behaviour & Human Resource Management

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0383	Organizational Behaviour & Human Resource Management	03	-	-	3-0-0	20	20	60	100	03

Course objectives: -

- Provide in depth understanding of theoretical development in human resource management and OB.
- Impart critical knowledge of leadership, GD, communication, motivation so to enable it to apply to proactive to use these resources efficiently and effectively.
- Use case study approach to make subject interesting and live.

CONTENT:-

Human Resource Management:- Strategic Human Resource Management, Creating Learning organizations, Corporate Social Responsibility, Value creation through HRM, Talent acquisition and Talent management, Business Leadership, Organization culture, Time management, Conflict management, Work values, HR Valuation and accounting, Emotional intelligence.

Organizational Behaviour: Introduction to Organisational Behavior, Management & Managers, OB-The Emerging Challenges, Historical Evaluation of Organisational Behavior, Foundation of Individual Behavior, Intelligence, Personality, Perceptions & attribution, Learning, attitudes & values, Motivation – Theories & principles, Applied Motivation Practices, Work Stress, Group dynamics, Team Dynamics, Power & political behavior, Conflict & negotiation, Leadership, Communication, Organizations, Organisational culture, Creativity & innovation, Organisational change & development, Decision making, Human resource policy & practices, International Organisational behavior.

Reference Books:

1. Organizational Behavior: Texts & Cases, A.K. Chitale, R.P. Mohanty & N.R. Dubey, PHI Learning Pvt Ltd, 2012
2. Organizational Behavior , K. Aswathappa, Himalaya Publications,2005.
3. Industrial Psychology Tiffin and Meccormic, Prentice hall 7th edition.
4. Social Psychology of Organization Behavior , Katz and Kahn, Wiley, 2nd edition.
5. Industrial Psychology by Ghosh and Ghorpede ,Himalaya publication 2010

Intellectual Property Rights

Course Code	Theory Course Name	L	T	P	Credits
CC4343	Intellectual Property Rights	-	2	-	P/NP

Course objectives:- Provide in depth understanding of intellectual property rights and their significance in Project management.

CONTENT:-

- ◆ Different types of Intellectual Property Rights
- ◆ What is patent
- ◆ Indian Patent laws and procedure for applying for a patent
- ◆ Patentable and non patentable inventions
- ◆ Patent search - national and Global
- ◆ Excavating and Exploiting the Patents Mine
- ◆ Trade Related aspects of Intellectual Property Rights
- ◆ Intellectual Property Protection of Living Species
- ◆ Exercising and Enforcing of Intellectual Property Rights
- ◆ International protection of Intellectual property
- ◆ Traditional Knowledge
- ◆ Controlling Overuse or Misuse of IPR
- ◆ Development and Transfer of technology, Assessment of technology, collaboration and absorption of technology.
- ◆ Rules in Technology Transfer – from Laboratory to Industry, Industry to Industry
- ◆ Entrepreneurial obligation based on innovation, based on patent right of individuals
- ◆ Exhaustion Principle and Parallel Imports
- ◆ Protecting Software and Computer-Related Innovations

Reference Books:-

1. Bare Act with Short notes, Universal Law Publishing Co. Pvt. Ltd.
2. Dr. B. L. Wadhera, Law Relating to Intellectual Property, Universal Law Publishing Co. Pvt. Ltd
3. Prabuddha Ganguli, Intellectual Property Rights, Mc Graw Hill Education, ISBN: 9780070077171.
4. Vandana Shiva, Protect Or Plunder?: Understanding Intellectual Property Rights, Published 2001.
5. Keith Eugene Maskus, Intellectual Property Rights in the Global Economy Published 2000, Peterson Institute.
6. Susan K. Sell Private Power, Public Law: The Globalization of Intellectual Property Rights Published 2003, Cambridge University Press.

Commercial Laws

Course Code	Theory Course Name	L	T	P	Credits
CC4344	Commercial Laws	-	2	-	P/NP

Course objectives:- Provide an overview of commercial laws and their significance in Project management.

CONTENT:-

Basics of law:- law of tender; law of tort; role of the project manager; insurance; bonds; builders liens; labour law; intellectual property; avoidance of claims and disputes; ADR, the arbitration act; future trends in contracting.

Sale and Acquisition of Goods:- Transfer of Title, The rule nemo dat quod non habet, Exceptions to nemo dat. Legal and Equitable Interest, Sale of Goods, Duties of Sellers and Buyers, Express and Implied Terms, Passing of Property, Applicable nemo dat exceptions, Remedies Non-sale Acquisitions: nemo dat, Applicable nemo dat exceptions.

Personal Property:- Personal Property and Interests in Personal Property, Types of Personal Property - Chose in Possession - Chose in Action, Ownership (especially mere equities) - Possession (finders' possessory, interests) - Bailment; Legal and Equitable Assignment Credit and Security Types of Security: Pledges - Liens – Mortgages (other than of land) - Bills of Sale - Fixed and Floating Charges Retention of Title (Romalpa) Clauses Set-off; Assignments of Choses in Action: Statutory, Legal and Equitable, Assignments, Rules of Priority, Banking and Customer Relationship, Negotiable Instruments: Bills of Exchange

Consumer Credit and Protection:- Regulatory Framework, Money Lenders Ordinance and Pawn Brokers Ordinance, Function and Power of Consumer Council, Funds for Litigation and Group Litigation Consumer Credit, Law of Guarantees, Consumer Protection, Unconscionable Contracts Ordinance, Control of Exemption Clauses Ordinance, Supply of Services (Implied Terms) Ordinance, Money Lenders Ordinance, Protection of Vulnerable Consumers: Misrepresentation, Undue Influence, Duress, Powers and Responsibilities of Personal Guarantor, Doctrine of relation back and fraudulent preference.

Reference Books:-

1. Chan Bo-ching, Simon, "Hong Kong Banking Law and Practice", Volumes One and Two, The Hong Kong Institute of Bankers, 2000 – 2001.
2. P Smart, CD Booth, S Briscoe, "Hong Kong Corporate Insolvency Manual", Hong Kong Society of Accountants, 2002.
3. PS Atiyah, John N Adams & Hector MacQueen, "The Sale of Goods", 11th Edition, Longman, 2005
4. R Goode, "Commercial Law", Penguin, 3rd Edn, 2004
5. LS Sealy, RJA Hooley, "Commercial Law: Text, Cases and Materials", 4th Edition
6. R Calnan, Taking Security: Law And Practice, Jordans, 2006.
7. H Beale, M Bridge, L Gullifer and E Lomnicka, The Law of Personal Property

Sustainable Manufacturing & Supply Chain Management Operations
Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0384	Sustainable Manufacturing & Supply Chain Management Operations	03	-	-	3-0-0	20	20	60	100	03

Course objectives:

- Impart analytical and conceptual skills in managing supply chain in coordinated manner.
- Provide foundation for sustainable and eco-friendly management of entire product lifecycle.
- To deepen the understanding of SCM by studying quantitative models and solving problems.
- Application of case study approach to understand real world complexity in managing supply chain.

CONTENT:-

Sustainable Manufacturing, Green Manufacturing, Value Stream Mapping

Building a Strategic Framework to analyze Supply Chains: Understanding the Supply Chain, Supply Chain Performance, Supply Chain Drivers and Metrics.

Designing the Supply Chain Network: Designing Distribution Networks and applications to Business, Network Design in the Supply Chain, Network Design in an Uncertain Environment.

Planning Demand and Supply in a Supply Chain: Demand Forecasting in a Supply Chain, Aggregate Planning in a Supply Chain, Managing Predictable Variability.

Planning and Managing Inventories in a Supply Chain: Managing Economics of Scale in a Supply Chain, Managing Uncertainty in a Supply Chain, Determining the Optimal level of Product Availability.

Designing and Planning Transportation Networks.

Managing Cross Functional Drivers in a Supply Chain: Sourcing Decisions in a Supply Chain, Information Technology in a Supply Chain.

Case Studies on above syllabus.

Reference Books:-

1. Supply Chain Management: Strategy, Planning & Operation, Chopra Sunil, Meindel Peter & Kalra D.V. , Pearson Prentice Hall.2011
2. Supply Chain Management: Texts & Cases, Shah Janat, Prentice Hall ,2011,
3. Materials Management Texts & Cases, Chitale A.K., Gupta R.C. & Gupta H.N.,PHI, 2011
4. The New Manufacturing Architecture, B.Mahadevan, Tata McGraw Hill Publishing Company Ltd ,2010
5. Operations Management, L.C.Jhamb, Everest Publishing House, Pune. 2010

Operations Strategy

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0385	Operations Strategy	03	-	-	3-0-0	20	20	60	100	03

Course objectives:

- Explain business and functional strategies and importance of operations strategy.
- Provide comprehensive framework for development of operations strategy in a given competitive environment and overall business strategy.
- Enable the particular project to select appropriate operations strategy.
- Develop in depth understanding of operations strategy of successful firms through case studies.

CONTENT:-

Principles of Strategy: Principles of Competitive Strategy, Partnerships, Challenges, and Responses. Introduction, Need and concepts of Operations strategy and links with corporate strategy.

Operations Strategy in a Factory: Manufacturing Outputs and Production Systems, Manufacturing Levers and Capability,

Competitive Analysis: Selecting the Best Production System. Framework for Manufacturing Strategy -Process of formulation and implementation. Emerging theory of manufacturing. Time the new source of competitive strategy. Competing through manufacturing.

Operations Strategy in an International network of factories: Principles of international competitive strategy, manufacturing in the world's major trading regions, manufacturing networks, network outputs, levers and capability, factory-types in international manufacturing networks.

Operations Strategy and Business Strategy

Integrating Operations strategy with business strategy

Programs used frequently in Operations strategy:-Improvement programs in operations, Focus, soft technologies, hard technologies, benefits of experience and the product life cycle, Evaluation of investments in manufacturing. Seven Production Systems for Focused Factories Job shop production system, Batch flow production system, Flexible manufacturing system, Operator-paced line flow production system, Just-in-Time production system, Equipment-paced line flow production system, Continuous flow production system.

Reference Books:-

1. Manufacturing Strategy, Hill, Terry, Richard D. McGraw-Hill, Irwin Inc, Third Edition 1999
2. Strategic Operations, Competing through Capabilities: Hayes, Robert H., Gary P. Pisano and David M. Upton, The Free Press, 1996
3. Manufacturing Strategy: John Miltenberg, Productivity Press, 2005

Maintenance Engineering & Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0386	Maintenance of Assets	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:- To Provide comprehensive understanding of maintenance management.

CONTENT:-

Introduction to maintenance systems: -Maintenance definition – Maintenance objectives – Maintenance management –Functions of maintenance department – Tero technology – Maintenance costs.

Maintenance models:-Maintenance policies – Imperfect maintenance – PM versus b/d maintenance –Optimal PM schedule and product characteristics – Inspection decisions: Maximizing profit – Minimizing downtime – Replacement models.

Maintenance Logistics:- Maintenance staffing – Human factors –Resource requirements: Optimal size of service facility – Optimal repair effort – Maintenance planning and scheduling – Spares planning – Capital spare.

Maintenance Quality:- Five Zero concept –FMECA – Maintainability prediction– Design for maintainability –Maintainability allocation – Reliability Centered Maintenance.

Total Productive Maintenance:- TPM fundamentals – Chronic and sporadic losses – Six big losses – OEE as a measure – TPM pillars– Autonomous maintenance –TPM implementation.

Recommended Books:-

1. Andrew K.S.Jardine & Albert H.C.Tsang, “Maintenance, Replacement and Reliability”, Taylor and Francis, 2006.
2. Bikas Badhury & S.K.Basu, “Tero Technology: Reliability Engineering and Maintenance Management”, Asian Books, 2003.
3. Seichi Nakajima, “Total Productive Maintenance”, Productivity Press, 1993.

Materials Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0387	Materials Management	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:

- Provide comprehensive background of materials management including importance and evolution of function, standard procurement practices, vendor selection and rating, logistic and quality management, inventory management with quantitative models.
- Provide legal framework operating materials management.
- Acquaint student with store management documentation and practices.
- Familiarize students with e-procurement practices in globalised world.

CONTENT:-

Material Management:- Management In Relation To Materials Function, Functions of Management as Applied to Materials, Management of Material Resources, Objectives of Material Management, Achieving Objectives, Effects of Business Changes, Balancing of Objectives, Limitation to Meeting Objectives.

Integrated Materials Management:- Activities of Materials Management, Importance of Materials Department, Costs involved in the Management of Materials, Need for Integrated Concept, Areas of Materials Management, Materials Management and Production Control, Inspection of Purchased Items, Relative Status of the Materials Managers, Desirable Quality of Purchase Materials Managements, Inter-Departmental Relationships, Advantages of Integrated Materials Managements

Classification, Identification And Codification:- Need For Classification Of Materials, Classification Of Materials – General Classification, Classification According To Condition Of Materials, Nature Of Codification, Process Of Codification, Merits Of Codification, Demerits Of Codification, The Codification Systems, Stores Vocabulary, Marking Of Stores.

Specification in Materials Management:- Objectives of Specification, Collaborative Development, Category of Specification, Development of Specification, Purchase Management Research, Writing Specification, Common Problems in Specification.

Standardization And Variety Reduction:- Historical Review, Three Dimensions Of Standards, Different Levels Of Standards, Various Foreign Standards In Use In India, How Is An Indian Standard Evolved?, Benefits Of Standardization, Standardization and variety reduction in products, Scope of variety reduction and standardization, Techniques Of Variety Reduction, The Three S's - Standardization, Simplification And Specialization, Simplification.

Material Planning:- Importance Of Materials Planning, Factors affecting materials planning, Flow chart for materials planning, Techniques of materials planning.

Budgeting And Material Planning:- Master Budget, Sales Budget, Production Budget, Material Budget, Labour Budget, Maintenance Budget, Overheads Budget, Administrative Budget, Capital Expenditure Budget, R & D Budget, Cash Budget, Flexible Budgeting.

Stores And Stores Keeping:- Storage Equipment, Principles Of Materials Handling, Planning principles, Inventory Control , Inventory Management Models, Selective Inventory Control, The Purchasing Cycle, Principles of Purchasing, The Nature Of Purchasing Process And

Vendor Rating, Value Analysis, Quality Assurance in Material Management, Make Or Buy Decisions, The Dangers Of In-Sourcing, Buyer-Seller Relationship, Negotiating Techniques, Disposal Of Surplus Obsolete And Scrap, Performance Appraisal Of Materials Department, Legal Aspect of Purchasing, Purchasing Of Capital Equipment, Public Buying, International Purchasing, Import Substitution, Logistics, Warehousing And Distribution Management, Case Studies on Materials Management.

Reference books:-

1. Materials Management: Text And Cases, A.K. Chitale, R.C. Gupta, Publisher, PHI Learning Pvt. Ltd 2007
2. Material Management , W. R. Stelzer Jr. (PHI)
3. Material Management, D. S. Ammer & Richard ,Erwin Inc.1980
4. Material Management, A. K. Dutta ,PHI,2004
5. Material Management- An Integrated Approach, P. Gopalakrishnan & M. Sundersen PHI,2006

Managerial Economics

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0388	Managerial Economics	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:-The course in Managerial Economics attempts to build a strong theoretical foundation for Project Management students. The course is mainly analytical in nature and focuses on clarifying fundamental concepts from microeconomic viewpoint. The students are expected to study and analyses the dynamics of managerial decision making through this course.

CONTENT:-

Definition, Nature and Scope of Managerial Economics, Managerial Economics and Microeconomics and macroeconomics. Managerial Economics and decision-making. Uses and Significance of Managerial Economics.

Meaning and Determinants of Demand. Demand Function, Law of Demand Market Demand, Elasticity of Demand, Types and Measurement of Elasticity, Demand Forecasting. Meaning, Significance and Methods of Demand Forecasting.

Production Function. Law of Variable Proportions. Law of Supply. Elasticity of Supply. Measurement of Elasticity of Supply.

Costs of Production. Short run and long run costs. Economies of Scale. Cost estimation and cost forecasting. Breakeven analysis.

Pricing Under Various Market Forms; Perfect competition, Monopoly Monopolistic Competition. Oligopoly. Price Discrimination.

Pricing Strategies and Methods. Cost plus Pricing. Marginal cost Pricing. Price Leadership. Transfer Pricing. Seasonal Pricing Seasonal Pricing. Cyclical Pricing.

Need For Government Intervention in Markets. Price Support. Price Controls. Prevention and Control of Monopolies. System of Dual Prices.

Recommended Books:-

1. Managerial Economics – Analysis, Problems and Cases, P.L.Mehta, Sultan Chand and Sons, New Delhi.
2. Managerial Economics - Varshney and Maheshwari, Sultan Chand and Sons, New Delhi.
3. Managerial Economics – D. Salvatore, McGraw Hill, New Delhi.
4. Managerial Economics - Mote, Paul and Gupta T M H, New Delhi.

Total Quality Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0389	Total Quality Management	03	-	-	3-0-0	20	20	60	100	03

Course Objectives: -

- To understand fundamentals of Customer satisfaction and philosophies of total quality management by renown quality gurus.
- To study various quality related costs.
- To study the scientific tools for quality improvement.
- Introduction to off-line quality control for quality improvement.
- To study the contemporary quality assurance standards.

CONTENT:-

Introduction-Quality–Basic concepts, dimensions, economics of quality, quality Gurus.

TQM:- Definition, evolution, journey from inspection to TQM, comparison at different stages, dimensions of TQM, TQM viewpoints, reasons for adopting TQM.

Introspection to TQM environment-Sphere of TQM, components of TQM, TQM – Managing Total Quality, Factors affecting TQM environment, Classification and interaction among factors, Researchers' viewpoint, TQM as a system, steps in TQM implementation, Roadblocks in TQM implementation, Reasons for TQM failure.

Role of soft options in TQM-Hard vs. Soft factors, Role and expectation of employer, employee, customer and supplier from organization and vice versa. Human factors in TQM, Role of top management commitment, work culture, motivation, coordination, attitude, innovation.

Quality initiatives in organizations-Role of tools and techniques in TQM, Classification of tools and techniques – Problem identification, Data analysis, Graphical, Creativity, Companywide . Brief description of Quality awards – MBNQA, Deming award, European quality award, Australian quality award.

TQM Effectiveness-Impact of TQM, Need and difficulty in measuring TQM effect, Parameters governing effect of TQM and the attributes thereof.

Reference books:-

1. Total Quality Management, Oakland Butterworth – Heinemann Ltd.2007

2. Managing for total quality from Deming to Taguchi and SPC, Logothetis N. PHI,2002
Total Quality Control, Feigenbaum A.V. MGH,1991
3. Total Quality Management, Besterfield Dale H, Pearson Education,2010
4. A slice by slice guide to TQM, John Gilbert, East West Press,2003
5. The TQM toolkit – a guide to practical techniques for TQM, Waller Jenny, Allen Derek and Burna Andrew, Kogan Page London,1995

Facilities Planning and Design

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0390	Facilities Planning & Design	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:-This course provides problems based techniques related with location, layout, material handling, maintenance, replacement of machines, etc

CONTENT:-

Introduction: Facilities requirement, need for layout study - types of layout.

Plant location: Plant location analysis - factors, costs, location decisions - simple problems in single facility location models, network location problems.

Layout design: Design cycle - SLP procedure manpower, machinery requirements – computer algorithms - ALDEP, CORELAP, CRAFT

Quantitative methods: Group technology - Production Flow analysis (PFA), ROC (Rank Order clustering) - Line balancing.

Materials handling: Principles, unit load concept, material handling system design, handling Equipment types, selection and specification, containers and packaging.

Depreciation, Replacement Analysis.

Reference Books:

1. Facilities planning, J.A. Tompkins. And J.A. White, John Wiley, 1984.
2. Plant Layout & Material Handling, J.M Apple, Krieger Publishing Company,1991
3. Facilities Planning and Materials Handling, Vijay Sheth, Marcle Decker, New York.1995
4. Practical Plant layout, Richard Muther, McGraw Hill 1956

Occupational safety, health & environment

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0391	Occupational safety, health & environment	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:- Developing the basic knowledge of occupational safety, health & environment & capability to apply ideas/concepts and latest techniques.

CONTENT:-

Concepts:- Concept of man-machine system Applications of human factors Engineering- Man as Sensor, Man as Information processor, and Man as Controller. Human Behavior Individual difference Motivation –Frustration and Conflicts – Attitudes -Learning concepts. Principles of Ergonomic Application of ergonomics in a work system – Principle of motion Economy effects of environment. Factors impeding safety – Technological factor –Physiological factor –Legal factor Administrative factors Personal protective equipments (different types, specifications, standards, testing procedures, and maintenance). Evolution of modern safety concept- Safety policy - Safety Organization - line and staff functions for safety- Safety Committee- budgeting for safety.

Techniques:- Incident Recall Technique (IRT), disaster control, Job Safety Analysis (JSA), safety survey, safety inspection, safety sampling, Safety Audit.

Accident Investigation and Reporting:- Concept of an accident, reportable and non reportable accidents, unsafe act and condition – principles of accident prevention, Supervisory role- Role of safety committee – Accident causation models - Cost of accident. Overall accident investigation process - Response to accidents, India reporting requirement, Planning document, Planning matrix, Investigators Kit, functions of investigator, four types of evidences, Records of accidents, accident reports- Class exercise with case study.

Safety Performance Monitoring:- permanent total disabilities, permanent partial disabilities, temporary total disabilities - Calculation of accident indices, frequency rate, severity rate, frequency severity incidence, incident rate, accident rate, safety “t” score, safety activity rate – problems.

Safety Education & Training:- Importance of training-identification of training needs-training methods – programme, seminars, conferences, competitions – method of promoting safe practice - motivation – communication - role of government agencies and private consulting agencies in safety training – creating awareness, awards, celebrations, safety posters, safety displays, safety pledge, safety incentive scheme, safety campaign – Domestic Safety and Training.

Regulations for Health, Safety and Environment:- Factories act and rules - Workmen compensation act. Indian explosive act - Gas cylinder rules - SMPV Act - Indian petroleum act and rules. Environmental pollution act Manufacture, Storage and Import of Hazardous Chemical rules 1989 Indian Electricity act and rules. Overview of OHSAS 18000 and ISO 14000

Reference Books:-

1. Accident Prevention Manual for Industrial Operations, N.S.C.Chicago, 1982
2. Industrial Accident Prevention, Heinrich H.W. McGraw-Hill Company, New York, 1980.

3. Safety Management in Industry, Krishnan N.V. Jaico Publishing House, Bombay, 1997.
4. The Factories Act 1948, Madras Book Agency, Chennai, 2000
5. The Environment Act (Protection) 1986, Commercial Law Publishers (India) Pvt. Ltd., New Delhi.
6. Water (Prevention and control of pollution) act 1974, Commercial Law publishers (India) Pvt. Ltd., New Delhi.
7. Air (Prevention and control of pollution) act 1981, Commercial Law Publishers India) Pvt. Ltd., New Delhi.
8. Explosive Act, 1884 and Explosive rules, 1883 (India), Eastern Book company, Lucknow, 10th Edition,2002
9. The manufacture, storage and import of hazardous chemical rules 1989, Madras book Agency, Chennai.
10. 10. ISO 9000 to OHSAS 18001, Dr. K.C. Arora, S.K. Kataria & Sons,2000

Advanced Operations Research

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0321	Advanced Operations Research	03	-	-	3-0-0	20	20	60	100	03

Course Objectives:- Developing the basic knowledge of Operations Research & develop capability to apply advanced techniques of Operations research for solving complex problems in Project management.

CONTENT:-

Operations Research:- Uses, Scope and Applications of Operation Research in managerial decision-making.

Decision-making environments:- Decision-making under certainty, uncertainty and risk situations; Decision tree approach and its applications.

Linear programming:- Mathematical formulations of LP Models for product-mix problems; graphical and simplex method of solving LP problems; sensitivity analysis; duality.

Transportation problem:- Various methods of finding Initial basic feasible solution and optimal solution.

Assignment model:- Algorithm and its applications.

Game Theory:- Concept of game; Two-person zero-sum game; Pure and Mixed Strategy Games; Saddle Point; Odds Method; Dominance Method and Graphical Method for solving Mixed Strategy Game.

Sequencing Problem:- Johnsons Algorithm for n Jobs and Two machines, n Jobs and Three Machines, Two jobs and m - Machines Problems.

Queuing Theory: - Characteristics of M/M/I Queue model; Application of Poisson and Exponential distribution in estimating arrival rate and service rate; Applications of Queue model for better service to the customers.

Replacement Problem:- Replacement of assets that deteriorate with time, replacement of assets which fail suddenly.

Project Management:- Rules for drawing the network diagram, Applications of CPM and PERT techniques in Project planning and control; crashing of operations.

Recommended Books:-

1. Vohra, Quantitative Techniques in Management (Tata McGraw-Hill, 2nd edition), 2003.
2. Kothari - Quantitative Techniques (Vikas 1996, 3rd Edition).
3. Taha Hamdy - Operations Research - An Introduction (Prentice-Hall, 7th edition)

4. Sharma J K - Operations Research (Pearson, 3rd Edition)
5. Kapoor V.K. - Operations Research (S. Chand, 4th Edition)

Technology Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0392	Technology Management	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:-This course attempts to build a strong theoretical foundation for Project Management students which can help them to solve hard problems as well as soft problems through the tools like technology development, acquisition, transfer, knowledge management and soft system methodology.

CONTENT:-

Technology management – Scope, components, and overview. Technology and environment, Technology and society, Technology Impact analysis, environmental, social, legal, political aspects, methods or techniques for analysis – steps involved. Technology policy strategy: Science and technology Policy of India, implications to industry. Technology forecasting – need, methodology and methods – trend Analysis, Analogy, Delphi, Soft System Methodology, Mathematical Models, Simulation, and System Dynamics. Technology Choice and Evaluation – Methods of analyzing alternate technologies, Techno-economic feasibility studies, Need for multi-criteria considerations such as, social, environmental, and political, Analytic hierarchy method, Fuzzy multi-criteria decision making, and other methods. Technology Transfer and Acquisition – Import regulations, Implications of “Uruguay Round”, and WTO, Bargaining process, Transfer option, MOU. Technology Adoption and Productivity – Adopting technology-human interactions, Organizational redesign and re-engineering, Technology productivity. Technology Absorption and Innovation – present status in India, Need for new outlook, Absorption strategies for acquired technology, Creating new/improved technologies, Innovations. Technology Measurement. Technology Audit.

Recommended Books:-

1. From Knowledge Management To Strategic Competence: Measuring Technological, Market and Organisational Innovation (Second Edition), edited by Joe Tidd
2. Market-Oriented Technology Management by Fred Phillips, Springer
3. Management of Technology (Hardcover) by Tarek Khalil, Maximilian von Zedtwitz, Georges Haour, Louis A. Lefebvre, Pergamon.
4. Management of Technology: Key Success Factors for Innovation and Sustainable Development by Laure Morel- Guimaraes, Tarek Khalil, Yasser A Hosni , Elsevier Science.
5. Technology Management: Text and International Cases by Norma Harrison, Danny Samson , McGraw-Hill/Irwin; 1 edition, 2001, ISBN: 0072383550

Ecology and Sustainable Development

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0393	Ecology and Sustainable Development	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:- To study the ecology and significance of sustainable development.

CONTENT:-

Introduction to Ecology and Sustainable Development: Components of the environment, Understanding environment and ecology -a systems perspective, Environment -a multi disciplinary perspective, Methodological approaches for environment & ecology analysis, Micro level environment, Macro level environment, Manmade environment, Natural environment.

Environment: ecology and quality of life, Environmental Crises, State of Environment in Developed and Developing Countries, Natural Resource Economics, Social Cost benefit Analysis, Sustainable Development.

Towards an ecological world: view, Ethics and ecological wisdom, the moral standing of ecosystems, Globalization and environmental issues, Ideologies of environmentalism – Awareness, Struggle, rehabilitation, appropriate technology, Scientific conservation.

Development and environment: Issues of Noise pollution, Land pollution (Municipal industrial, Commercial, hazardous solid waste) Water pollution, Air pollution & Traffic Management,

Ecological Behavior & Knowledge management: recycling, energy, water conservation, political activism, Consumerism, Commitment to environmental organizations.

Corporate Social responsibility: Policy consideration, Training for environmental mental set - The issue of altering habits, Managing Environmental challenges for future

Reference Books:-

1. The environmental ethics and policy book Philosophy, ecology, economics. II edition. 2003
2. Ecology and equity Madhu Gadgil and Ramchander Guha, Penguin books, 1995
3. Environment, ecology, and social development: Anuradha Sharma

Environmental Impact Assessment & Audit

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
CE0353	Environmental Impact Assessment & Audit	3	-	-	3-0-0	20	20	60	100	03

Course objective: To study the impact of project on environment.

CONTENT :-

Environmental impact assessment, Brief history, Significance, Objectives, Role in planning and decision making process, Environmental assessment process, Assessment methodologies, Socioeconomic impact assessment, air, noise, water, vegetation & wildlife and energy impact analysis, cumulative impact assessment, ecological impact assessment, risk assessment, Environmental impact statement, Basic concepts behind EIS, Various Stages in EIS production, Typical EIS outline, Rapid EIA, Environmental auditing, Aims & Objectives, Audit principles, Partial environmental audits, Scope of audit, Case studies

Reference Books:-

1. Environmental Impact Assessment, Larry W. Canter, Mc-Graw Hill international Edition 1995.
2. Environmental Audit, A.K. Mhasker, M/s Media Enviro EIA Notification Govt of India, 2005

Innovation, Entrepreneurship & Business Transformation

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0394	Innovation, Entrepreneurship & Business Transformation	3	-	-	3-0-0	20	20	60	100	03

Course objectives:

- Emphasis the concept and importance of innovation, entrepreneurship and business transformation.
- Provide methodical and comprehensive framework for developing innovative and entrepreneurial organization.
- Provide understanding for creating environment and strategies for success full business transformation.
- Develop understanding of real world complexity through case studies.

CONTENT:-

Innovations Vs Creativity, Strategic Management of Technology through Creativity & Innovation, Technology Fusion and R & D, Knowledge Management fundamentals, Entrepreneurship & Economic Development, Concept, Need and functions of entrepreneurship, Types of ownership, Risk management, Theories of Motivation, Operating environment of small industrial units, Socio-Psychological aspects of Entrepreneurship Development, Personnel Management & Industrial Relations, Inventory Management, Managerial Economics, Marketing & Distribution Management for small industries sector, Government Support, Incentives and Regulations for Ancillaries and Small Industrial Units, Procedure for starting new Industrial Unit, Sources of finance, The economic theories of development and their limitations; entrepreneurship behavior with special reference to risk taking behavior, psychological characteristics of entrepreneurs and Entrepreneur as an agent of change, Corporate Social Responsibility, Organizations as a laboratory of learning, Women entrepreneurship, Techniques for Total Productivity & Quality Management, Case studies on Entrepreneurship.

Reference Books:-

1. Management of Technology and Innovation: Competing through Technological Excellence, P.N. Rastogi, Sage Publications Inc, California.2009
2. Entrepreneurship, Creativity and Organization: Text, Cases & Readings, John J. Kao Prentice Hall, Englewood Cliffs, and New Jersey.2007
3. Innovation & Entrepreneurship: Practice & Principles, Peter F. Drucker Affiliated East-West Press Pvt Ltd, New Delhi.1992
4. Entrepreneurial Development, Vasant Desai , Himalaya Publishing House, Mumbai.2010
5. Entrepreneurship, David H. Holt, Prentice Hall India.2005

6. Handbook of Management Skills , The Industrial Society Robert Hyde House,
London.2006

Marketing Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0395	Marketing Management	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:-

- Provide comprehensive understanding of market, marketing, selling and marketing mix.
- Impart appropriate background for designing marketing strategy including PLM for a firm.
- Give insights and real world complexity in marketing through Indian case studies

CONTENT:-

Introduction to Marketing function: genesis, the marketing concept.

Marketing Management System: objectives, its interfaces with other functions in the organization.

Environment of Marketing- Economic Environment, Market: market segmentation. Consumer-buyer behavior models. Socio- cultural environment. Legal Environment. Ethical issues in marketing.

Marketing Strategy: Marketing planning and Marketing programming. The concept of marketing mix, Product policy; the concept of product life cycle. New product decisions.

Test marketing- Pricing Management of distribution: channels of distribution. Advertising and production. The concept of Unique Selling Proposition.

Implementation and Control: The marketing organization- alternative organization structures; the concept of product management. Administration of the marketing programme, sales forecasting; marketing and sales budgeting; sales management; management of sales force. Evaluation of marketing performance; sales analysis; control of marketing effort; marketing audit.

Reference Books:-

1. Marketing Classics, A Selection of Influential Articles, Enis, B.M. New York, McGraw Hill, 1991.
2. Principles of Marketing. Kotler, Philip and Armstrong, G New Delhi, Prentice Hall of India, 1997.
3. Marketing Management: Analysis, Planning, Implementation and Control, Kotler, Philip. New Delhi, Prentice Hall of India, 1994.
4. Marketing Management: Planning, Control, Ramaswamy, VS and Namakumari, S New Delhi, McMillan, 1990.
5. Fundamentals of Marketing. Stanton, William, J. New York, McGraw Hill, 1994.
6. Marketing in India: Cases and Readings. Neelamegham, S. New Delhi, Vikas 1988.

MIS & Enterprise Resource Planning

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0396	MIS & Enterprise Resource Planning	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:- To understand the role of Management Information System and ERP in project management.

CONTENT:-

Introduction:- Organization & Types, Decision Making, Data & information, Characteristics & Classification of information, Cost & value of information, various channels of information & MIS.

Foundation of Information System: Introduction to Information System in Business Fundamentals of Information System, Solving Business Problems with Information System, Concept of Balanced MIS, Effectiveness & Efficiency Criteria. Tool and Techniques of MIS- dataflow diagram, flow chart etc.

Business application of information technology: electronic commerce Internet, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information system for managerial Decision Support, Information System for Strategic Advantage.

Managing Information Technology: Enterprise & Global Management, Security & Ethical Challenges, Planning & Implementing Change. Reports: Various types of MIS reports, GUI & Other Presentation tools.

Advanced concepts in information system: Enterprise Resource Planning: introduction, various modules like Human Resources, Finance, Accounting, Production Logistics. Supply Chain Management, CRM, Procurement, and Management System Object Oriented modeling case studies.

Reference Books: -

1. Introduction to Information System, O.Brian, McGraw Hill.2012
2. Management Information System, O.Brian, Galgotia Publications ,2011
3. Information Systems for Managers, Arora & Bhatia, Excel,2009
4. Information System Analysis & Design, Bansal, TMH.2004
5. Alexis Leon, "Enterprise Resource Planning", TMH.2007

Operations Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0397	Operations Management	3	-	-	3-0-0	20	20	60	100	03

Objectives of the course: -

- To gain an understanding and in-depth knowledge of the various operations management philosophies and practices prevalent in industry.
- To reinforce analytical skills already learned, and build on these skills to further increase ones "portfolio" of useful analytical tools.
- To learn how to think about, approach, analyze, and solve production system problems using both technology and people skills.

CONTENT:-

Overview of Production & Operations Management:- Introduction , Responsibilities of Production Manager, Strategic Decisions in Operations, Manufacturing Vs. Service Operation, Types of Production processes (Project/Job, Batch, Mass/Line , Continuous), Concept of FMS(Flexible Manufacturing System), Vertical integration, Productivity & Factors affecting productivity, Role of Production, Planning & Control (PPC), New Product Development & Process Design, Learning Curve, Introduction of Work Study, Method study Procedure, Principles of Motion Economy, Stop Watch Time Study Procedure, Importance of Rating & Allowances in Time Study, Pre-determined Time Standard (MTM).

Aggregate Planning, Capacity Planning and Project Management, Scheduling, Maintenance Management:- Aggregate Planning: Relevant cost; Evaluation of strategic alternatives (Level, Chase and Mixed), Types of capacity, Economics and Diseconomies of scale, Developing capacity alternatives. Project Management: Basic concept, Network principles-CPM, PERT, Crashing, Sequencing, 2 and 3 Machine cases: Johnson's Rule, Job shop Scheduling: Priority dispatching Rules, Importance of Maintenance, Breakdown, Preventive, Predictive and TPM(Total Productive Maintenance), Basic concept of Reliability.

Facility Location and Layout, Inventory Control, Quality Control:- Importance & Factors affecting the Plant Location, Single and Multi facility location Techniques (Centroid and Minimax method), Plant Layout & its classification, Relationship Diagram & Block Diagramming, Assembly Line of Balancing, Inventory Control: Relevant Costs, P & Q Systems of Inventory, Basic EOQ Model, and Model with Quantity discount, Economic Batch Quantity. Safety Stock, Reorder Point, ABC Analysis, Material Requirement Planning, Concept of Quality Management, Quality of Design, Statistical Quality Control, X Bar, R and P Charts. Acceptance sampling, Elementary concept on TQM (Total Quality Management) ,JIT(Just In Time)

Case Study:- Relevant cases have to be discussed in following areas: Aggregate Planning Strategies, CRAFT (Computerized Relative Allocation of Facilities Technique), ROC (Rank Order Clustering Method), Material Requirement Planning.

Reference Books:

1. B.Mahadevan, Operations Management: Theory and Practice, PEARSON Education,2012.
2. Narasimhan, Mcleavey, Billington, Production Planning & Inventory Control, Prentice Hall of India, Edition 1997.
3. Chary S.N., Theory and Problems in Production and Operation Management, Tata McGraw Hill, Edition 1995.
4. Roberta S. Russell, Bernard W. Taylor III, Operations Management, Wiley India, Edition 2007.
5. Lee J. Krajewski, Larry P. Ritzman, Manoj K. Malhotra, Operations Management 9/E, Prentice Hall, Edition 2009.

World Class Manufacturing

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0357	World Class Manufacturing	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:-

- To understand the concept of Excellence in manufacturing – Traditional & current concepts.
- Building organization strength through Customer focus – Overcoming impediments.
- To learn how to achieve stability and sustain Excellent manufacturing practices.

CONTENT:-

Historical perspective:- World class Excellent organizations – Models for manufacturing excellence – Business Excellence.

Benchmark, Bottlenecks and Best Practices:- Concepts of benchmarking, bottleneck and best practices, Best performers – Gaining competitive edge through world class manufacturing – Value added manufacturing – eliminating waste – Toyota Production System – example.

System & tools for world class manufacturing:- Improving Product & Process Design – Lean Production – SQC , FMS, Rapid Prototyping , Poka Yoke , 5-S ,3 M, use of IT ,JIT, Product Mix , Optimizing , Procurement & stores practices , Total Productive maintenance , Visual Control.

Human Resource Management in WCM:- Adding value to the organization – Organizational learning – techniques of removing Root cause of problems – People as problem solvers – New organizational structures. Associates – Facilitators – Teamwork – Motivation and reward in the age of continuous improvement.

Typical characteristics of WCM companies:- Performance indicators – what is world class Performance – Six Sigma philosophy

Indian Scenario:- Leading Indian companies towards world class manufacturing – Task Ahead.

Reference Books:-

1. World Class Manufacturing - Strategic Perspective - B.S. Sahay, KBC Saxena , Ashish Kumar .,Mac Millan,2000
2. Making Common Sense Common Practice – Models for manufacturing excellence – Ron Moore ,Butter worth Heinmann ,2004
3. The Toyota Way - Jeffrey K.Liker – Tata Macgraw Hill,2004
4. Operations Management for Competitive Advantage – Chase,TMH,2006
5. Managing Technology & Innovation for Competitive Advantage – Narayanan,Pearson,2001

6. Just In Time Manufacturing – M.G.Korgaonkar ,Mac Millan,2000

7. Machine That Changed The World – Womack,Free press New York,2007

Disaster Management

Elective

Course Code	Theory Course Name	L	P	T	Credits	TWA	IST	ESE	Total	ESE Hours
CE0457	Disaster Management	3	-	-	03	20	20	60	100	03

Course Objectives:- The Course would focus on types of Environmental hazards & Disasters. The main objective is to study the emerging approaches in Disaster Reduction & Management. The emphasis will be on programmes of National & International organizations for Disaster preparedness, Mitigation and awareness.

CONTENT:-

Environmental Hazards & Disasters: Concept of Environmental Hazards, Environmental stress & Environmental Disasters, Different approaches & relation with human Ecology, Human ecology & its application in geographical researches, Types of Environmental hazards & Disasters.

Emerging approaches in Disaster Management- Three Stages: Pre- disaster stage, Emergency Stage, Post Disaster stage-Rehabilitation Natural Disaster Reduction & Management Disaster Management- An integrated approach for disaster preparedness, mitigation & awareness.

Integrated Planning- Contingency management Preparedness: Education on disasters, Community involvement, The adjustment of Human Population to Natural hazards & disasters Role of Media

Monitoring Management- Discuss the programme of disaster research & mitigation of disaster.

Reference Books:-

1. Environmental Geography, Savinder Singh ,Prayag Pustak Bhawan, 1997
2. The Environment as Hazards, Kates,B.I & White, G.F, Oxford, New York, 1978
3. Disaster Management, R.B. Singh, Rawat Publication, New Delhi, 2000
4. Space Technology for Disaster Mitigation in India (INCED),R.B. Singh, University of Tokyo, 1994
5. Action Plan For Earthquake, A.S. Arya Disaster, Mitigation in V.K. Sharma Disaster Management IIPA Publication New Delhi, 1994
6. An overview on Natural & Manmade Disaster & their Reduction, R.K. Bhandani, CSIR,

New Delhi ,1994

7. Manuals Natural Disaster management in India, National Centre for Disaster Management,
M.C. Gupta IIPA, New Delhi, 2000

Software Project Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0398	Software Project Management	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:- Developing the basic knowledge of software project management & capability to apply ideas/concepts and latest techniques.

CONTENT:-

Introduction and Software Project Planning:- Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

Project Organization and Scheduling:- Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

Project Monitoring and Control:- Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index(SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

Software Quality Assurance and Testing:- Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

Project Management and Project Management Tools:- Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Recommended Books:-

1. Software Project Management by M. Cotterell
2. Software Project Managemnet by S. A. Kelkar

International Business

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
PE0399	International Business	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:- To enlighten the students on International Business Environment, which includes international Financial management, International marketing and international Currency and to study the impact of globalization on Indian Industry.

CONTENT:-

Meaning and features of International Business Management, Globalization forces – Meaning, dimensions and stages in Globalization – Globalization Boon or bane – Introduction to theories of International Trade by Adam Smith, Ricardo and Ohlin & Heckler – Trading Environment of International Trade- Tariff and Non-Tariff Barriers – Trade blocks.

Analysis of Global Environment – Political Economic, Social & Cultural Legal, Technological, Natural Environments country Risk Analysis. Opportunities and threats for International Business. Rise of New economics like Brazil, Russia, India and China (BRIC) and ASIAN countries.

International Financial Management – Balance of Trade and Balance of Payment – International Monetary fund. Asian Development Bank, World Bank, Introduction to Export and Import finance, methods of Payment in International Trade, International Financial Instruments.

Bilateral and Multilateral Trade Laws – general Agreements on Trade & Tariffs (GATT), World Trade Organization (WTO), different rounds, IPR, TRIPS, TRIMS, GATS, Ministerial Conferences, SAARC.

International Marketing – Objectives and Challenges in International Marketing, Major Players in International marketing, market Selection, Entry Strategies.

International Currency and Currency Crisis:-

- Euro-Phases, Benefit and cost
- Euro and Implication for India
- Trade invoicing in Euro Vs Dollar
- Southeast Asian Currency Crisis

Globalization and its impact on Indian Industry- globalization and Internal reform process, current Exim Policy. India's Competitive advantage in Industries like. I.T., Textiles, Gems & Jewelry etc. – Potential and threats, Indian Multinationals. SEZ – Introduction – Types of

economic zones, Meaning and Nature of SEZ – Mechanism of setting of SEZ, opposition to SEZ.

Case Studies and Web Exercises:-

- a) Case Studies on:- Global Environment Analysis, International Marketing, International Finance, Country Risk Analysis
- b) Web Exercises:- Visit websites of different International organizations like, UNO, World Bank, International Monetary Fund, SAARC, Euro and related links etc.

Reference Books:-

1. International Business Environment – Sundaram and Black
2. International Business Environment – Bhalla and Raju
3. International Financial Management – P.G. Apte
4. International Business – Francis Cherunilam
5. International Business – Rao and Rangachari
6. International Business Environment and operations –John D. Daniels
7. International Business – Justin Paul

Risk & Value Management

Elective

Course Code	Theory Course Name	L	T	P	Credits	TWA	IST	ESE	Total	ESE Hours
CE0451	Risk & Value Management	3	-	-	3-0-0	20	20	60	100	03

Course Objectives:- Developing the basic knowledge of Risk & Value Management and develop capability to apply such principles for handling complex problems in Project management.

CONTENT:-

Project Risks:- Definition, dynamic and static risk, uncertainty and risk. Risk and construction project time, money and technology, the people and the risks, processes and risks, risks and clients, consultants and contractors, risk allocation in contracting.

Human Aspects:- Personnel attitude towards risk, perceptions and risks, individuals and groups, communication in risk management, concept of utility and risks.

Risk management system:- Risk identification, sources of risks, risk classification, types, impact and consequences of risk, risk analysis, Sensitivity analysis, breakeven analysis ,scenario analysis, risk response: retention, reduction, transfer, avoidance.

Qualitative and quantitative methods in risk management:- Qualitative risk assessment, risk register, probability – Impact matrix, project appraisal, cost benefit analysis, Monte- Carlo technique, portfolio theory, Delphi method, influence diagrams, decision trees.

Value Engineering:- Value, Reasons of poor value in constructed facilities, habits, road blocks and attitudes.

Value management:- Value Engineering job plan, function analysis, purpose and implications of life cycle costs, Impact of energy on cost of constructed facilities, managing value engineering study.

Disasters:- Natural and manmade, possible effects, Disaster recovery plan Disaster recovery plan: basic requirements, documenting disaster recovery plan, rehearsing the disaster recovery plan, example disaster recovery plan.

Reference Books:-

1. N J Smith, Managing Risk in Construction Projects.
2. L W Zimmerman and G D Hart, value Engineering, CBS Publishers.
3. R Flagnan R and G Norman, Risk management and Construction, Blackwell Scientific.
4. Thompson P A and Perry J G, Engineering Construction Risks- A guide to Project risk analysis and risk management, Thomas Telford.

