

Syllabus of I & II Semester B.E./B.Tech.

Common to all Engineering Branches
(With effect from 2010-2011)



Visvesvaraya Technological University, Belgaum

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Regulations Governing B.E./B.Tech. and I Year Scheme & Syllabus

(With effect from 2010-2011)
(Common to all Engineering Branches)

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Regulations Governing THE DEGREE OF BACHELOR OF ENGINEERING / TECHNOLOGY

OB 1 TITLE AND DURATION OF THE COURSE

OB 1.1 The course shall be called the degree course in Bachelor of Engineering / Technology, abbreviated as B.E. / B.Tech.

OB 1.2 The course shall be of four academic years duration divided into eight semesters, each semester having duration of 16 weeks. For evening courses the contact hours are to be satisfied by working extra on afternoons of Saturdays and Sundays.

OB 1.3 The calendar of events in respect of the course shall be fixed by the University from time to time.

OB 1.4 The examination in all the subjects shall be conducted at the end of each semester for all the eight semesters.

OB 2 ELIGIBILITY FOR ADMISSION (The Government orders issued from time to time in this regard shall prevail.)

OB 2.1 Admission to I year/ I semester Bachelor Degree in Engineering/ Technology shall be open for the candidates who have passed the second year Pre-University or XII standard or equivalent examination recognized by the University.

OB 2.2 In addition to OB 2.1, the candidate shall have secured not less than forty five percent (45%) marks in the aggregate with Physics and Mathematics as compulsory subjects, along with one of the following subjects, namely, Chemistry, Bio-Technology, Computer Science, Biology and Electronics.

Provided that, the minimum marks for the purpose of eligibility shall be forty percent (40%) in optional subjects in case of candidates belonging to SC/ST and OBC candidates from Karnataka.

Provided that, the candidate shall have studied and passed English as one of the subjects.

OB 2.3 (a) Admission to II year/ III semester Bachelor Degree in Engineering/ Technology (Lateral Entry) shall be open to the candidates who are holders of a diploma or equivalent qualification as recognized by University who have secured not less than forty five percentage (45%) marks in the final year examination (fifth and sixth semesters) in the appropriate branch of engineering.

Provided that, in case of SC/ST and OBC candidates from Karnataka, the minimum marks for eligibility shall be forty percent (40%).

Provided further that, all the candidates seeking lateral entry shall also clear prescribed bridge courses as specified by the University.

OB 2.3 (b) Admission to Evening Course shall be open to a candidate

- i) who on the first day of the term notified by the University for the year of admission has not less than one-year professional experience in the branch of engineering / technology, in which the candidate holds a diploma, after passing diploma course.

Explanation: Professional experience means employment on regular basis

- a. in Government, Government undertaking, Public Sector undertaking, Corporations or
- b. in a private company registered under the Directorate of Industries and Commerce or the Directorate of Small Scale Industries or
- c. in Government, Government recognized institutions as technical staff.

Provided that the period of apprenticeship undergone shall also be treated as professional experience, if sponsored by the Board of Apprenticeship Training, Southern Region Chennai or by any Government, Government undertaking or Public Sector undertaking.

Provided further that employment shall be in an establishment situated within the urban agglomeration of city in which the professional institution is situated.

OB 2.4 Those candidates who have passed a qualifying examination other than the PUC II examination of the Pre-University Education Board of Karnataka, or Engineering Diploma Examinations of the Board of Technical Education of Karnataka, have to obtain eligibility certificate for seeking admission to B.E./B.Tech. Degree course from Visvesvaraya Technological University, Belgaum, or from the Principal of concerned Engineering College of Karnataka State.

OB 3 ATTENDANCE REQUIREMENT

OB 3.1 Each semester is considered as a unit and the candidate has to put in a minimum attendance of 85% in each subject with a provision of condonation of 10% of the attendance by the Vice-Chancellor on the specific recommendation of the Principal of the college where the candidate is studying, showing some reasonable cause such as medical grounds, participation in University level sports, cultural activities, seminars, workshops and paper presentation, etc.

OB 3.2 The basis for the calculation of the attendance shall be the period prescribed by the University by its calendar of events. For the first semester students, the same is reckoned from the date of admission to the course as per CET allotment.

OB 3.3 The students shall be informed about their attendance position periodically by the colleges so that the students shall be cautioned to make up the shortage. The Principals of the affiliated Colleges shall submit the list of students who have been detained for shortage of attendance by the end of the semester to the Registrar (Evaluation) with a copy to the Registrar.

Provided that mere omission by the college to inform the student about the shortage of attendance shall not entitle him to appear for examination.

OB 3.4 A Candidate having shortage of attendance in one or more subjects shall have to repeat the whole semester and such candidates shall not be permitted to take admission to next higher semester.

Such students shall take readmission to the same semester in the subsequent academic year.

- OB 3.5** **Temporary Discontinuation of course:**
A student, who wishes to temporarily discontinue the course and continue subsequently, has to obtain prior permission from the University by applying through the Principal. Such students have to take readmission to the same semester/year in the subsequent academic year. However, the candidate shall complete the course as per OB 6.2.

OB 4 **INTERNAL ASSESSMENT MARKS**

- OB 4.1** There shall be a maximum of 25 Internal Assessment Marks in each theory or practical papers. For seminars, the Internal Assessment marks shall be 50.
- OB 4.2** The Internal Assessment marks in a theory subject shall be based on two tests generally conducted at the end of 8 and 12 weeks of each semester. An additional test may be conducted for desirous students before the end of the semester to give an opportunity to such students to improve their Internal Assessment Marks, subject to the provisions of OB 4.13. The test shall be answered in Blue Books with pages serially numbered. These blue books shall be kept in the custody of the Principal of the College until one month from the date of announcement of the result by the University. These shall be made available to University authorities for verification as per the directions of the Registrar (Evaluation)/ Registrar.
- OB 4.3** Average of the better marks obtained from any two tests shall be the Internal Assessment Marks for the relevant subject.
- OB 4.4** If a candidate remains absent for all the Internal Assessment tests conducted, the Internal Assessment Marks shall be marked as A for the subject against the University Seat Number (USN) of the candidate in the marks sheet submitted to the University by the Principal of the College.
- OB 4.5** In the case of a Practical, the IA marks shall be based on the laboratory journals/reports and one practical test.

- OB 4.6** i) The IA marks for 1 year Computer Aided Engineering / Drawing:
a) 15 marks for class work (sketching and Computer Aided Engineering drawing).
b) 10 marks for test in the same pattern as that of the main examination (better of the two tests)
ii) The IA marks for other Drawings and Design Drawings offered by Various branches shall be based on the evaluation of the sheets and one test in the ratio 60:40.
- OB 4.7** The IA marks in the case of Project and seminar in the final year shall be based on the evaluation at the end of 8th semester by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of who shall be the project / seminar guide.
- OB 4.8** The final list, incorporating corrections (if any) of IA marks awarded to the students in the Theory / Practical / Project work / Seminar, shall be displayed on the notice board of the college at least seven days before the closure of the semester and a certified copy of the same shall be sent by the Principals to the University Examination Section within the stipulated date. Every page of the IA marks sheets shall bear the signature of the concerned Teacher/Teachers, Head of the Department and Principal.
- OB 4.9** Any corrections or over writing of IA marks shall bear the signature(s) of concerned Teacher(s) and in such cases the Head of the Department shall on every sheet indicate the number of corrections and attest it with his signature.
- OB4.10 (a)** A candidate failing to secure a minimum of 50% of the IA marks (12/25) in Practical, 50% of marks in project work, shall not be eligible for the practical / project in the University examination.
- OB4.10 (b)** For seminars, the minimum requirement of IA marks shall be 40% of the maximum.
- OB 4.11** Such candidates as mentioned in OB 4.10, shall repeat the laboratory work/project work during the subsequent semester(s) and secure at least the minimum marks prescribed.

- OB 4.12** For theory subjects, there shall not be any minimum requirements of IA marks.
- OB 4.13** Improvement of IA marks shall not be allowed
a. In theory subjects and
b. in Laboratory / Workshop / Seminar where the candidate has already secured the minimum required marks.
- OB 4.14** IA marks of those candidates to whom OB 4.11 is applicable, shall be sent separately to the Registrar (Evaluation).
- OB 4.15** IA marks shall reach the University before the commencement of examination. After the submission of Internal Assessment marks to the University, any request for change of IA marks shall not be considered under any circumstances.
- OB 5** **ELIGIBILITY FOR PASSING**
- OB 5.1 (a)** For a pass in a theory subject/drawing, the candidate shall secure minimum of 35% of the maximum marks prescribed in the University examination and 40% of marks in the aggregate inclusive of the IA marks.
- OB 5.1 (b)** For a pass in a Practical/Project/Viva-voce examination, a candidate shall secure a minimum of 40% of the maximum marks prescribed for the University Examination in the relevant Practical/Project/Viva-voce.
- OB 5.1 (c)** For a pass in Seminar, a candidate shall secure a minimum of 40% of the maximum marks prescribed.
- OB 5.2** The candidates who do not satisfy the condition OB 5.1 shall be deemed to have failed in that subject and may reappear for the University examination in the subsequent examinations. However, the IA marks awarded to the candidate/s at first attempt in the concerned theory subject will be carried forward. In case of Practicals/Projects/Seminar revised marks will be taken as per regulations OB 4.10 (a & b) and OB 4.11.

- OB 5.3** The candidate who passes a subject of a semester as per OB 5.1 is not allowed to appear for the same again, unless he/she opts for rejection of results as per OB 5.4, 5.5, 5.6, 5.7 & 5.8.
- OB 5.4** A candidate may at his desire reject his total performance of a semester (including IA marks) or he may reject the result of his performance in University examination of a semester only. Provided that the rejection is permitted only once during the entire course of study.
- OB 5.5** The candidate who desires to reject the performance as per OB 5.4 shall reject performance in all the subjects of the semester, irrespective of whether the candidate has passed or failed in any subject. However, the rejection of performance of 8th semester project results shall not be permitted.
- OB 5.6** A candidate who desires to reject the total performance of the semester including Internal Assessment, has to take readmission for the relevant semester. Application for such readmission shall be sent to the Registrar, through the Principal of College within 30 days from the date of the announcement of the results. Late submission of application shall not be accepted for any reasons. Readmission to First semester in such cases will not be considered as fresh admission i.e., the candidate will continue to have the same University Seat Number, which was allotted earlier.
- OB 5.7** The candidate, who desires to reject only the results of University examination of a semester and does not desire readmission, shall be permitted to re-appear for examinations of all the subjects of the semester in the subsequent examinations. However, the IA marks obtained by the candidate in the rejected semester shall be retained. Applications for such rejection shall be sent to the Registrar (Evaluation) through the Principal of the College within 30 days from the date of announcement of the results. Late submission of applications shall not be accepted for any reasons.

If the rejection of the University examination results of the semester happens to be of an odd semester, the candidate shall be allowed to take admission to the immediate next even semester. However, if the rejection of the University result is of even semester, the candidate shall not be allowed to take admission to the next odd semester.

OB 5.8

Such candidates who opt for rejection at final year are eligible for the award of class and distinction at the B.E./ B.Tech., degree level, but are not eligible for the award of ranks.

OB 5.9

A candidate shall be declared to have completed the course of B.E./B.Tech. degree, provided the candidate has undergone the stipulated course work in all eight semesters as per the regulations.

OB 6

MAXIMUM DURATION FOR COURSE COMPLETION:

OB 6.1

A candidate who has not obtained the eligibility for third semester after a period of three academic years from the date of first admission shall discontinue the course. However, the candidate is eligible for readmission for first year B.E./B.Tech. in respective College of the University and he/ she shall be allotted a University Seat Number (USN) without any change in the year of admission in the USN but the serial number of the candidate shall start with six hundred (6XX) series in the same branch. (Amended and approved in 52nd E.C. Res. No. 2.4)

OB 6.2

The candidate shall complete the course within a period of eight academic years from the date of first admission, failing which he/she has to discontinue the course.

Provided that the candidates admitted under lateral entry scheme shall complete the course within a period of six academic years from the date of first admission, failing which he / she has to discontinue the course.

(Amended and approved in 74th E.C. Res. No. 6.1 dated 12-8-2008)

OB 7

PROMOTION AND ELIGIBILITY FOR THE EXAMINATIONS

OB 7.1

There shall not be any restriction for promotion from odd semester to the next even semester, provided the candidate has fulfilled the attendance requirement.

OB 7.2

A candidate is eligible for promotion from even semester to the next odd semester (i.e. to the next academic year) if the candidate has not failed in more than four heads of passing of the immediately preceding two semesters and has passed in all the subjects of all the still lower semester examinations. A theory or practical shall be treated as a head of passing.

Illustrations

- A candidate seeking eligibility to 3rd semester should not have failed in more than 4 heads of passing of first and second semesters taken together.
- A candidate seeking eligibility to 5th semester should have passed in all the subjects of 1st and 2nd semesters and should not have failed in more than 4 heads of passing of third and fourth semesters taken together.
- A candidate seeking eligibility to 7th semester should have passed in all the subjects up to 4th semester and should not have failed in more than 4 heads of passing of 5th and 6th semesters taken together.

OB 8

ELECTIVES

OB 8.1

A candidate shall take one elective in 6th semester from 'Group A', two electives in 7th semester (one each from groups 'B' and 'C') and two electives in 8th semester (one each from groups 'D' and 'E'). There shall be a minimum of three electives are to be listed in every group.

OB 8.2

The minimum number of students to be registered for an Elective to be offered shall be not less than ten.

OB 8.3

A candidate shall exercise his option in respect of electives and register for the same at the beginning of concerned semester. The candidate may be permitted to opt for change of elective subject within 15 days from the date of commencement of the semester as per the calendar of the University.

OB 9 SEMINAR AND PROJECT

OB 9.1 Seminar topic shall be selected from the emerging technical areas only.

OB 9.2 Project work at 8th semester shall be completed batch wise, each batch consisting of a maximum of four candidates.

OB 9.3 *Viva-Voce* examination in project work shall be conducted batch-wise.

OB 10 AWARD OF CLASS AT SEMESTER LEVEL

OB 10.1 For the award of First Class with Distinction in a semester, the candidate shall have secured not less than 70% marks in aggregate in the first attempt and shall have passed in all subjects in one or more attempts.

OB 10.2 For the award of First Class in a semester examination, the candidate shall have securing not less than 60% but less than 70% marks in aggregate in first attempt and shall have passed in all subjects in one or more attempts.

OB 10.3 A candidate who secures in a semester less than 60% of marks in aggregate in first attempt and passes in all the subjects in one or more attempts, shall be declared to have passed the semester examination in only Second Class.

OB 11 AWARD OF CLASS AT DEGREE LEVEL

OB 11.1 The Bachelor Degree in Engineering/Technology shall be awarded to the candidates who have passed all the stipulated examinations from 1st to 8th semesters. However, declaration of the class of the degree shall be based on the performance of the candidate in first attempt from 5th to 8th semester examinations taken together.

OB 11.2 A candidate who has passed in all subjects of 1st to 8th semester securing not less than 70% marks in the first attempt of 5th to 8th semesters taken together shall be declared to be eligible for the award of the B.E. / B.Tech. degree in first class with distinction.

OB 11.3 A candidate who has passed in all subjects of 1st to 8th semester securing not less than 60% but less than 70% of marks in aggregate in the first attempt in 5th to 8th semester examinations taken together shall be declared to be eligible for the award of the B.E./ B.Tech. degree in First Class.

OB 11.4 A candidate who has passed in all subjects of 1st to 8th semester securing less than 60% in aggregate in the first attempt in 5th to 8th semesters shall be declared to be eligible for the award of the B.E. / B.Tech. degree in Second Class.

OB 11.5 The marks secured by the candidate in a semester examination after rejecting the results shall also be taken as first attempt marks and shall be considered for the award of class of the Semester/ Degree but not for award of rank.

OB 12 AWARD OF PRIZES, MEDALS & RANKS

OB 12.1 For the award of Prizes and Medals, the conditions stipulated by the Donor may be considered subject to the provisions of the statutes framed by the University for such awards.

OB 12.2 For award of ranks in a branch, a minimum of 10 candidates should have appeared in the 8th semester examination. The total number of ranks awarded shall be 10% of total number of candidates appeared in 8th semester or 10 whichever is less in that branch.

OB 12.3 For award of rank in a branch of Engineering / Technology, the aggregate marks secured by the candidate from 5th semester to 8th semester shall be considered. A candidate shall be eligible for a rank at the time of award of degree in each branch of Engineering / Technology, provided the candidate

- a. Has passed 1st to 8th semester in all the subjects in first attempt only
- b. Has not repeated/rejected any of the lower semesters.

OB 13
OB 13.1

Transfer of students from one College to another College within Karnataka State is permitted only at the beginning of third, fifth, and seventh semesters, subject to availability of seats within the permitted intake in respective Colleges and subject to the prior approval of the University and the provisions of OB 7.2. In the case of candidates from Universities other than VTU they should have passed in all the subjects of 1st and 2nd semesters for admission to 3rd semester and all the subjects of 1st to 4th semesters for admission to 5th semester and all the subjects of 1st to 6th semesters for admission to 7th semester.

The candidates seeking admission from Universities other than VTU shall have to

- apply for establishment of equivalence with prescribed fees as notified by VTU and
- obtain No Objection for admission from the University before commencement of term as notified by VTU

OB 13.2

Transfer of students within the College from one branch to another branch at 3rd semester shall be permitted with the prior approval of the VTU and subject to the provisions made by the Government of Karnataka/ AICTE in this behalf.

OB 13.3

The University may prescribe fee for administrative purpose (for updating of the records), which shall be notified from time to time, for transfer from one college to another (Change of College) or within the College (change of branch).

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
SCHEME OF TEACHING AND EXAMINATION

I SEMESTER B.E./B.TECH.

Sl. No.	Subject Code	Subject	Teaching Department	Board	Theory /Lab/ Drawing (Hrs/Week)	PHYSICS GROUP		
						Th./Pr.	I.A.	Total
1	10MAT11	Engineering Maths-I	Maths	Basic Sc.	4 (T)	100	25	125
2	10PHY12	Engineering Physics	Physics	Basic Sc.	4 (T)	100	25	125
3	10CIV13	Elements of Civil Engg. & Engineering Mechanics	Civil Engg.	Civil Engg.	4 (T)	100	25	125
4	10EME14	Elements of Mechanical Engg.	Mech. Engg.	Mech. Engg.	4 (T)	100	25	125
5	10ELE15	Basic Electrical Engg.	E & E	E & E	4 (T)	100	25	125
6	10WSL16	Workshop Practice	Mech., Auto, IP, IEM, Mfg. Engg.	Mech. Engg.	3 (L)	50	25	75
7	10PHYL17	Engg. Physics Lab	Physics	Basic Sc.	3 (L)	50	25	75
8	10CIP18	*Constitution of India & Professional Ethics	Any Department		2 (T)	50	25	75
9		Language (Kan.)	Humanities		2 (T)	---	---	---
Total						**600	**175	775

I SEMESTER B.E./B.TECH.**CHEMISTRY GROUP**

Sl. No.	Subject Code	Subject	Teaching Department	Board	Theory /Lab/ Drawing (Hrs/ Week)	Examination Marks		
						Th./Pr.	I.A.	Total
1	10MAT11	Engineering Maths-I	Maths	Basic Sc.	4 (T)	100	25	125
2	10CHE12	Engineering Chemistry	Chemistry	Basic Sc.	4 (T)	100	25	125
3	10CCP13	Computer Concepts & C Programming	Any Engineering Department	CSE	4 (T)	100	25	125
4	10CED14	Computer Aided Engineering Drawing	Mech./IP/Auto/Mfg.Engg./IEM	Mech. Engg.	6 (2T + 4L)	100	25	125
5	10ELN15	Basic Electronics	E & C / E & E / TC / IT	E & C	4 (T)	100	25	125
6	10CPL16	Computer Programming Lab	Any Engineering Department	CSE	3 (L)	50	25	75
7	10CHEL17	Engg. Chemistry Lab	Chemistry	Basic Sc.	3 (L)	50	25	75
8	10CIV18	*Environmental Studies	Civil / Environmental	Civil	2 (T)	50	25	75
9		Language (Eng.)	Humanities		2 (T)	---	---	---
Total					32	**600	**175	775

2

II SEMESTER B.E./B.TECH.**PHYSICS GROUP**

Sl. No.	Subject Code	Subject	Teaching Department	Board	Theory /Lab/ Drawing (Hrs/ Week)	Examination Marks		
						Th./Pr.	I.A.	Total
1	10MAT21	Engineering Maths-II	Maths	Basic Sc.	4 (T)	100	25	125
2	10PHY22	Engineering Physics	Physics	Basic Sc.	4 (T)	100	25	125
3	10CIV23	Elements of Civil Engg. & Engineering Mechanics	Civil Engg.	Civil Engg.	4 (T)	100	25	125
4	10EME24	Elements of Mechanical Engg.	Mech. Engg.	Mech. Engg.	4 (T)	100	25	125
5	10ELE25	Basic Electrical Engg.	E & E	E & E	4 (T)	100	25	125
6	10WSL26	Workshop Practice	Mech./IP/Auto/Mfg.Engg./IEM	Mech. Engg.	3 (L)	50	25	75
7	10PHYL27	Engg. Physics Lab	Physics	Basic Sc.	3 (L)	50	25	75
8	10CIP28	*Constitution of India & Professional Ethics	Any Department	Civil	2 (T)	50	25	75
9		Language (Kan.)	Humanities		2 (T)	---	---	---
Total					30	**600	**175	775

3

Sl. No.	Subject Code	Subject	Teaching Department	Board	Theory /Lab/ Drawing (Hrs/Week)	Examination Marks		
						Th./Pr.	I.A.	Total
1	10MAT21	Engineering Maths-II	Maths	Basic Sc.	4 (T)	100	25	125
2	10CHE22	Engineering Chemistry	Chemistry	Basic Sc.	4 (T)	100	25	125
3	10CCP23	Computer Concepts & C Programming	Any Engineering Department	CSE	4 (T)	100	25	125
4	10CED24	Computer Aided Engineering Drawing	Mech./IP/Auto/Mfg. Engg./ IEM	Mech. Engg.	6 (2T + 4L)	100	25	125
5	10ELN25	Basic Electronics	E & C/ E & E / TC / IT	E & C	4 (T)	100	25	125
6	10CPL26	Computer Programming Lab	Any Engineering Department	CSE	3 (L)	50	25	75
7	10CHEL27	Engg. Chemistry Lab	Chemistry	Basic Sc.	3 (3)	50	25	75
8	10CIV28	*Environmental Studies	Civil / Environmental	Civil	2 (T)	50	25	75
9		Language (Eng.)	Humanities		2 (T)	---	---	---
			Total		32	**600	**175	775

*CIP/Env.Engg. : Question Papers will be of Objective Type. Students have to pass the subject compulsorily, however marks will not be considered for awarding class / rank.

**Excluding Environmental Studies/Constitution of India & Professional Ethics

Language (Kan./Eng.) – Audit Course

ENGINEERING MATHEMATICS – I

Sub Code	: 10MAT11	IA Marks	: 25
Hrs/ Week	: 04	Examn Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART-A

UNIT – 1

Differential Calculus - 1

Determination of nth derivative of standard functions-illustrative examples*. Leibnitz's theorem (without proof) and problems.

Rolle's Theorem – Geometrical interpretation. Lagrange's and Cauchy's mean value theorems. Taylor's and Maclaurin's series expansions of function of one variable (without proof).

6 Hours

UNIT – 2

Differential Calculus - 2

Indeterminate forms – L'Hospital's rule (without proof), Polar curves: Angle between polar curves, Pedal equation for polar curves. Derivative of arc length – concept and formulae without proof. Radius of curvature - Cartesian, parametric, polar and pedal forms.

7 Hours

UNIT – 3

Differential Calculus - 3

Partial differentiation: Partial derivatives, total derivative and chain rule, Jacobians-direct evaluation.

Taylor's expansion of a function of two variables-illustrative examples*. Maxima and Minima for function of two variables. Applications – Errors and approximations.

6 Hours

UNIT – 4

Vector Calculus

Scalar and vector point functions – Gradient, Divergence, Curl, Laplacian, Solenoidal and Irrotational vectors.

Vector Identities: $\text{div}(\nabla \vec{A})$, $\text{Curl}(\nabla \vec{A})$, $\text{Curl}(\text{grad } \phi)$, $\text{div}(\text{Curl } \vec{A})$, $\text{div}(\vec{A} \times \vec{B})$ & $\text{Curl}(\text{Curl } \vec{A})$.

Orthogonal Curvilinear Coordinates – Definition, unit vectors, scale factors, orthogonality of Cylindrical and Spherical Systems. Expression for Gradient, Divergence, Curl, Laplacian in an orthogonal system and also in Cartesian, Cylindrical and Spherical System as particular cases – No problems

7 Hours

PART-B

UNIT – V

Integral Calculus

Differentiation under the integral sign – simple problems with constant limits. Reduction formulae for the integrals of $\sin^n x$, $\cos^n x$, $\sin^m x / \cos^n x$ and evaluation of these integrals with standard limits - Problems.

Tracing of curves in Cartesian, Parametric and polar forms – illustrative examples*. Applications – Area, Perimeter, surface area and volume.

Computation of these in respect of the curves – (i) Astroid: $x^{2/3} + y^{2/3} = a^{2/3}$

(ii) Cycloid: $x = a(\theta - \sin \theta)$, $y = a(1 - \cos \theta)$ and (iii) Cardioid: $r = a(1 + \cos \theta)$

6 Hours

UNIT – VI

Differential Equations

Solution of first order and first degree equations: Recapitulation of the method of separation of variables with illustrative examples*. Homogeneous, Exact, Linear equations and reducible to these forms. Applications - orthogonal trajectories.

7 Hours

UNIT – VII

Linear Algebra-1

Recapitulation of Matrix theory. Elementary transformations, Reduction of the given matrix to echelon and normal forms, Rank of a matrix, consistency of a system of linear equations and solution. Solution of a system of linear homogeneous equations (trivial and non-trivial solutions). Solution of a system of non-homogeneous equations by Gauss elimination and Gauss – Jordan methods.

6 Hours

UNIT – VIII:

Linear Algebra -2

Linear transformations, Eigen values and eigen vectors of a square matrix. Similarity of matrices, Reduction to diagonal form, Quadratic forms, Reduction of quadratic form into canonical form, Nature of quadratic forms

7 Hours

Note: * In the case of illustrative examples, questions are not to be set.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Latest edition, Khanna Publishers
2. Erwin Kreyszig, Advanced Engineering Mathematics, Latest edition, Wiley Publications.

Reference Books:

1. B.V. Ramana, Higher Engineering Mathematics, Latest edition, Tata Mc. Graw Hill Publications.
2. Peter V. O'Neil, Engineering Mathematics, CENGAGE Learning India Pvt Ltd. Publishers

ENGINEERING PHYSICS

Sub Code : 10PHY12/10PHY22
Hrs/ Week : 04
Total Hrs. : 52

IA Marks : 25
Exam Hours : 03
Exam Marks : 100

PART – A

UNIT-1

Modern Physics

Introduction to Blackbody radiation spectrum, Photo-electric effect, Compton effect. Wave particle Dualism. de Broglie hypothesis – de Broglie wavelength, extension to electron particle. – Davisson and Germer Experiment.

Matter waves and their Characteristic properties. Phase velocity, group velocity and Particle velocity. Relation between phase velocity and group velocity. Relation between group velocity and particle velocity. Expression for deBroglie wavelength using group velocity.

7 Hours

UNIT-2

Quantum Mechanics

Heisenberg's uncertainty principle and its physical significance. Application of uncertainty principle (Non-existence of electron in the nucleus, Explanation for β -decay and kinetic energy of electron in an atom). Wave function. Properties and Physical significance of a wave function. Probability density and Normalisation of wave function. Setting up of a one dimensional, time independent Schrödinger wave equation. Eigen values and Eigen functions. Application of Schrödinger wave equation – Energy Eigen values for a free particle. Energy Eigen values of a particle in a potential well of infinite depth.

6 Hours

UNIT-3

Electrical Conductivity in Metals

Free-electron concept. Classical free-electron theory - Assumptions. Drift velocity. Mean collision time and mean free path. Relaxation time. Expression for drift velocity. Expression for electrical conductivity in metals. Effect of impurity and temperature on electrical resistivity of metals. Failures of classical free-electron theory.

Quantum free-electron theory - Assumptions. Fermi - Dirac Statistics. Fermi energy – Fermi factor. Density of states (No derivation). Expression for electrical resistivity / conductivity. Temperature dependence of resistivity of metals. Merits of Quantum free – electron theory.

7 Hours

UNIT-4

Dielectric & Magnetic Properties of Materials

Dielectric constant and polarisation of dielectric materials. Types of polarisation. Equation for internal field in liquids and solids (one dimensional). Clausius – Mossotti equation. Ferro and Piezo – electricity (qualitative). Frequency dependence of dielectric constant. Important applications of dielectric materials. Classification of dia, para and ferromagnetic materials. Hysteresis in ferromagnetic materials. Soft and Hard magnetic materials. Applications.

7 Hours

PART – B

UNIT - 5

Lasers

Principle and production. Einstein's coefficients (expression for energy density). Requisites of a Laser system. Condition for Laser action. Principle, Construction and working of He-Ne and semiconductor Laser. Applications of Laser – Laser welding, cutting and drilling. Measurement of atmospheric pollutants. Holography – Principle of Recording and reconstruction of 3-D images. Selected applications of holography.

6 Hours

UNIT-6

Optical Fibers & Superconductivity

Propagation mechanism in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Attenuation. Applications – block diagram discussion of point to point communication.

Temperature dependence of resistivity in superconducting materials. Effect of magnetic field (Meissner effect). Type I and Type II superconductors - Temperature dependence of critical field. BCS theory (qualitative). High temperature superconductors. Applications of superconductors– Superconducting magnets, Maglev vehicles and squids

7 Hours

UNIT-7

Crystal Structure

Space lattice, Bravais lattice - unit cell, primitive cell. Lattice parameters. Crystal systems. Direction and planes in a crystal. Miller indices. Expression for inter-planar spacing. Co-ordination number. Atomic packing factor. Bragg's Law. Determination of crystal structure by Bragg's x-ray spectrometer. Crystal structures of NaCl, and diamond.

6 Hours

UNIT-8**Material Science**

Introduction to Nanoscience and Nanotechnology. Nanomaterials: Shapes of nanomaterials, Methods of preparation of nanomaterials, Wonders of nanotechnology: Discovery of Fullerene and carbon nanotubes, Applications. Ultrasonic non-destructive testing of materials. Measurements of velocity in solids and liquids, Elastic constants.

6 Hours**Text Books**

	Title	Author/s / Editor	Publishers
1	Solid State Physics – Sixth Edition	S.O. Pillai	New Age International
2	Engineering Physics	V. Rajendran	Tata Mc-Graw Hill Company Ltd., New Delhi

Reference Books

	Title	Author/s / Editor	Publishers
1	Nanosystems- Molecular Machinery, Manufacturing and Computation	K.Eric Drexler	John Wiley & Sons 2005 Ed.
2	Fundamentals and Applications of Ultrasonic Waves	J David N Cheeke and Cheeke N Cheeke	CRC Press
3	Nano Materials	Vishwanathan	Narosa Publications
4	Engineering Physics	G.K Shivakumar	Prism Books Pvt. Ltd.

ENGINEERING CHEMISTRY

Sub Code	: 10CHE12/ 10CHE 22	IA Marks	: 25
Hrs/ Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART – A**UNIT – 1****Electrode Potential and Cells**

Introduction. Differences between galvanic and electrolytic cells. Construction of galvanic cell, EMF of a cell, Origin of single electrode potential, Sign convention and cell notation, Standard electrode potential. Derivation of Nernst equation for single electrode potential. Types of electrodes: Reference electrodes – Primary and secondary. Limitations of standard hydrogen electrode, Construction and working of calomel electrode and Ag – AgCl electrode, Measurement of single electrode potential, Numerical problems on electrode potential and EMF of a cell, Ion selective electrode: Glass electrode – Construction, Determination of pH of a solution using glass electrode, concentration cells, numerical problems.

7 Hours**UNIT - 2****Batteries and Fuel Cells**

Basic concepts, Battery characteristics – primary, secondary and reserve batteries with examples, super capacitors. Classical batteries: Construction, working and applications of Zn – MnO₂. Lead acid storage and Ni – Cd batteries. Modern batteries: Construction, working and applications of Zn – air, Ni – metal hydride and Li – MnO₂ batteries. Fuel cells – Differences between battery and fuel cell, construction and working of H₂ – O₂ and CH₃OH – O₂ fuel cells.

6 Hours**UNIT - 3****Corrosion and its control**

Electrochemical theory of corrosion, Galvanic series, Types of corrosion- Differential metal corrosion, Differential aeration corrosion (Pitting and water line corrosion), Stress corrosion (caustic embrittlement in boilers), Factors affecting the rate of corrosion. Corrosion control: Inorganic coatings – Anodizing and phosphating, Metal coatings – Galvanizing and Tinning, Corrosion inhibitors, cathodic protection.

7 Hours

UNIT - 4

Metal Finishing

Technological importance. Significance of Polarization, Decomposition potential and Overvoltage in electroplating, Theory of electroplating. Effect of plating variables on the nature of electrodeposit- Electroplating process, Electroplating of gold and Chromium.

Distinction between electroplating and electrolessplating, Electrolessplating of copper and nickel.

6 Hours

PART – B

UNIT – 5

Chemical fuels and Photovoltaic cells

Introduction, Classification of chemical fuels Calorific value – High and Low calorific values, Determination of calorific value –solid or liquid fuel using Bomb calorimeter - numerical problems .

Petroleum – Cracking by fluidized catalytic cracking process, Reformation of petrol, Octane and Cetane numbers. Knocking – mechanism and harmful effects. Antiknocking agents – TEL, Catalytic converters – Principle and working, Unleaded petrol, Power alcohol and Biodiesel.

Photovoltaic cells – Production of solar grade silicon, Doping of silicon, Construction and working of photovoltaic cell, Advantages.

7 Hours

UNIT – 6

The Phase rule and Instrumental methods of analysis

Statement of Gibb's phase rule and explanation of the terms involved, Phase diagram of one component system – water system, Condensed phase rule , Phase diagram of two component system- Eutectic Pb – Ag system and Fe – C system. Application – Desilverization of lead.

Instrumental methods of analysis- Theory , Instrumentation and applications of Colorimetry, Potentiometry , Conductometry and Flame photometry.

6 Hours

UNIT - 7

Polymers

Types of polymerization – Addition and Condensation, Mechanism of polymerization – Free radical mechanism taking ethylene as example. Glass transition temperature (T_g), Structure – property relationship. Types of plastics – Thermosetting and thermoplastics. Manufacture of plastics by compression ,injection and extrusion moulding.

Synthesis and applications of Teflon, PMMA, Polyurethane and Phenol – formaldehyde resins.

Elastomers: Deficiencies of natural rubber, Vulcanization of rubber. Synthesis and applications of Neoprene and Butyl rubber, Silicone rubbers.

Adhesives: Synthesis and applications of epoxy resins.

Polymer composites - Synthesis and applications of Kevlar and Carbon fibers.

Conducting polymers – Definition, Mechanism of conduction in Polyacetylene, applications.

7 Hours

UNIT - 8

Water Chemistry

Impurities in water ,Water analysis – Determination of different constituents in water – Hardness, alkalinity, chloride , fluoride , nitrate , sulphate and dissolved oxygen. Numerical problems on hardness and alkalinity. Sewage – BOD and COD, Numerical problems, Sewage treatment. Desalination of water – Reverse Osmosis and Electro dialysis

6 Hours

Text Books:

1. Chemistry for Engineering students by B.S. Jai Prakash, R.Venugopal, Sivakumaraiah and Pushpa Iyengar
2. Engineering Chemistry by O.G. Palanna, Tata McGraw Hill Publishing Pvt.Ltd. New Delhi 2009

Reference Books:

1. Principles of Physical Chemistry B.R. Puri , L.R.Sharma & M.S. Pathania, S. Nagin chand and Co.
2. A text book of Engineering Chemistry P.C. Jain and Monica Jain Dhanpatrai Publications , New Delhi.
- 1 Corrosion Engineering M.G. Fontana Mc. Graw Hill Publications.
- 2 Chemistry in Engineering and Technology (Vol. 1 &2) J.C. Kuriacose and J. Rajaram.
- 3 Polymer Science V.R. Gowariker , Wiley Eastern Ltd.

ELEMENTS OF CIVIL ENGINEERING & ENGINEERING MECHANICS

Sub Code : 10CIV13/10CIV23	IA Marks : 25
Hrs/ Week : 04	Exam Hours : 03
Total Hrs. : 52	Exam Marks : 100

PART - A

UNIT-1

1. Introduction to Civil Engineering, Scope of different fields of Civil Engineering - Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.

Infrastructure: Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country.

4 Hours

2. Roads: Type of roads, Components and their functions.

2 Hours

3. Bridges and Dams: Different types with simple sketches.

1 Hour

UNIT -2

4. Introduction to Engineering mechanics: Basic idealisations - Particle, Continuum and Rigid body; Force and its characteristics, types of forces, Classification of force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Newton's laws of motion, Introduction to SI units, Moment of a force, couple, moment of a couple, characteristics of couple, Equivalent force - couple system; Resolution of forces, composition of forces; Numerical problems on moment of forces and couples, on equivalent force - couple system.

7 Hours

UNIT -3

5. Composition of forces - Definition of Resultant; Composition of coplanar - concurrent force system. Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems.

3 Hours

6. Composition of coplanar - non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force systems.

5 Hours

UNIT -4

7. Centroid of plane figures; Locating the centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built up sections; Numerical problems.

6 Hours

PART - B

UNIT -5

8. Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar - concurrent and non concurrent force systems.

6 Hours

UNIT -6

9. Types of supports, statically determinate beams, Numerical problems on support reactions for statically determinate beams and analysis of simple trusses (Method of joints and method of sections).

6 Hours

UNIT -7

10. Friction - Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes; Wedge friction; Ladder friction; Numerical problems.

6 Hours

UNIT -8

11. Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, circular and triangular areas from method of integration; Moment of inertia of composite areas; Numerical problems.

6 Hours

Text Books:

1. Engineering Mechanics by S.Timoshenko, D.H.Young, and J.V.Rao TATA McGraw-Hill Book Company, New Delhi
2. Elements of Civil Engineering (IV Edition) by S.S. Bhavikatti, New Age International Publisher, New Delhi, 3rd edition 2009.
3. Elements of Civil Engineering and Engineering Mechanics by M.N.Sheshaprakash and G.B.Mogaveer PHI Learning (2009)

Reference Books:

1. Engineering Mechanics B.Bhattacharyya, Oxford University Press 2008
2. Engineering Mechanics by K.L. Kumar, Tata McGraw-Hill Publishing Company, New Delhi.
3. Engineering Mechanics by MVS Rao and D.R.Durgaiah. University Press (2005)
4. Engineering Mechanics by Nelson, Tata McGraw Hill Edn. India Pvt Ltd.
5. Fundamentals of Engineering Mechanics Ali Hassan and Khan , Acme Learning Pvt Ltd.

COMPUTER CONCEPTS AND C PROGRAMMING

Subject Code	: 10CCP13/10CCP23	IA Marks	: 25
Hrs/Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART – A**UNIT-1****Introduction to Computer Systems, Interacting with the Computer, Computer Organization**

The Computer defined, Early history, Basic parts and structure of a computer, Categorizing Computers, Information Processing life cycle, Essential computer hardware, Essential computer software.

Keyboard, Mouse, Inputting data in other ways: Pen-based systems, Data scanning devices, Game controllers, Voice recognition devices, Microphone, Visual input devices, Video and sound, Monitors, Printers, Plotters, Data projectors, Sound systems. Number systems, ASCII, BCD, CPU, Buses, Mother Board, Chip sets, Microprocessors.

7 Hours

UNIT-2**Storage Device Concepts, Operating Systems, Networking**

Storage media, Floppy drive, Hard disks, Optical media, CD-ROM, CD-R, CD-RW, DVD-ROM, Recordable DVD.

Software, Custom-made Software, Shrunken-wrapped software, Types of operating systems, Computer processing techniques, Functions of Operating Systems, Management of processor, Memory, Virtual storage, devices, and information.

Networking, Convergence of computing with communications, Networking basics, Need for networking, Basic components of a network.

7 Hours

UNIT-3**Fundamentals of Problem Solving, Introduction to C Language**

Creating and running programs, System development, Software Engineering. Introduction to C Language: Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Programming example, Software Engineering, Tips and common programming errors.

6 Hours

UNIT-4

Structure of a C Program

Expressions, Precedence and associativity, Side effects, Evaluating expressions, Type conversion, Statements, Programming examples, Software Engineering, Tips and common programming errors.

6 Hours

PART - B

UNIT-5

Functions

Designing structured programs, Functions in C, User-defined Functions, Inter-function communication, Standard functions, Scope, Programming examples, Software Engineering, Tips and common programming errors.

6 Hours

UNIT-6

Selection – Making Decisions, Repetition

Logical data and operators, Two-way selection, Multiway-selection, Concept of a loop, pre-test and post-test loops, Initialization and updating, Event controlled and count controlled loops, Loops in C, Other statements related to looping, looping applications, Recursion, Programming examples, Software Engineering, Tips and common programming errors.

7 Hours

UNIT-7

Arrays, Strings

Concepts, Using arrays in C, Inter-function communication, Array applications, Bubble Sort, Binary search, Two-dimensional Arrays, Multi-dimensional arrays, String concepts, C strings, String input/output, Programming examples, Software Engineering, Tips and common programming errors.

7 Hours

UNIT-8

Basic Concepts of Parallel Programming

Motivating parallelism, Scope for parallel computing, Thread basics, Why threads? OpenMP: A standard for directive – based parallel programming, The OpenMP programming model, Specifying concurrent tasks in OpenMP, Synchronization constructs in OpenMP, Data handling in OpenMP, OpenMP library functions, Environment variables in OpenMP.

6 Hours

Text Books:

1. Vikas Gupta: Computer Concepts and C Programming, Dreamtech Press/Wiley India, 2009.
2. Behrouz A. Forouzan, Richard F. Gilberg: Computer Science - A Structured Approach Using C, 3rd Edition, Cengage Learning, 2007.
3. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar: Introduction to Parallel Computing, 2nd Edition, Pearson Education, 2003.

Reference Books:

1. Peter Norton: Introduction to Computers, 7th Edition, Tata McGraw Hill, 2010.
2. E. Balagurusamy: Programming in ANSI C, 4th Edition, Tata McGraw Hill, 2008.
3. Brian W. Kernighan and Dennis Ritchie: The C Programming Language, 2nd Edition, PHI, 1998.

Web Reference: <http://elearning.vtu.ac.in>

ELEMENTS OF MECHANICAL ENGINEERING

Sub Code	: 10EME14 / 10EME24	IA Marks	: 25
Hrs/ Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART – A

UNIT-1

Energy and Steam

Forms, Sources and Classification of energy. Utilization of energy with simple block diagrams. Steam formation. Types of steam. Steam properties – Specific Volume, Enthalpy and Internal energy. (simple numerical problems) Steam boilers – classification, Lancashire boiler, Babcock and Wilcox boiler, Boiler mountings, Accessories, their locations and applications. (No sketches for mountings and accessories)

7 Hours

UNIT-2

Turbines

Steam turbines – Classification, Principle of operation of Impulse and reaction. Delaval's turbine, Parson's turbine. Compounding of Impulse turbines.

Gas turbines – Classification, Working principles and Operations of Open cycle and Closed cycle gas turbines.

Water turbines – Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine

7 Hours

UNIT-3

Internal Combustion Engines

Classification, I.C. Engines parts, 2/4 – Stroke Petrol and 4-stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Simple problems on indicated power, Brake power, Indicated thermal efficiency, Brake thermal efficiency, Mechanical efficiency and specific fuel consumption.

6 Hours

UNIT-4

Refrigeration and Air conditioning

Refrigerants, Properties of refrigerants, List of commonly used refrigerants. Refrigeration - Definitions - Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, Relative COP, Unit of Refrigeration. Principle and working of vapor compression refrigeration and vapor absorption refrigeration. Principles and applications of air conditioners, Room air conditioner.

6 Hours

PART – B

UNIT-5

Lathe and Drilling Machines

Lathe - Principle of working of a centre lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling, Taper turning by Tailstock offset method and Compound slide swiveling method. Specification of Lathe.

Drilling Machine – Principle of working and classification of drilling machines. bench drilling Machine, Radial drilling machine. Operations on drilling machine -Drilling, Boring, Reaming, Tapping, Counter sinking, Counter boring and Spot facing. Specification of radial drilling machine.

7 Hours

UNIT-6

Milling and Grinding Machines

Milling Machine – Principle of milling, Types of milling machines. Principle & working of horizontal and vertical milling machines. Milling Processes - Plane milling, End milling, Slot milling, Angular milling, Form milling, Straddle milling and Gang milling. Specification of universal milling machine.

Grinding Machine – Principle and classification of Grinding Machines. Abrasives- Definition, Types and applications. Bonding materials. Type of Grinding machines, Principle and working of surface grinding, Cylindrical grinding and Centerless grinding.

7 Hours

UNIT-7

Joining Processes, Lubrication and Bearings

Soldering, Brazing and Welding

Definitions. Classification and method of Soldering, Brazing and welding and differences. Brief description of arc welding and Oxy-Acetylene welding

Lubrication and Bearings

Lubricants-Classification and properties. Screwcap, Tell-Tale, Drop feed, Wick feed and Needle lubricators. Ring, Splash and Full pressure lubrication. Classification of bearings, Bushed bearing, Pedestal bearing, Pivot bearing, Collar bearings and Antifriction bearings.

6 Hours

UNIT-S

Power Transmission

Belt Drives - Classification and applications. Derivations on length of belt, Definitions - Velocity ratio, Creep and slip, Idler pulley, stepped pulley and fast & loose pulley.

Gears - Definitions, Terminology, Types and uses. Gear drives and **Gear Trains** - Definitions and classifications, Simple problems.

6 Hours

Text Books:

1. A Text Book of Elements of Mechanical Engineering - S. Trymbaka Murthy, 3rd revised edition 2006, I.K. International Publishing House Pvt. Ltd., New Delhi.

Reference Books:

1. A Text Book of Elements of Mechanical Engineering - K.R. Gopalkrishna, Subhash Publishers, Bangalore.
2. The Elements of Workshop Technology - Vol I & II, SKH Chowdhary, AKH Chowdhary, Nirjhar Roy, 11th edition 2001, Media Promotors and Publishers, Mumbai.
3. Elements of Mechanical Engineering -Dr.A.S.Ravindra, Best Publications, 7th edition 2009.

COMPUTER AIDED ENGINEERING DRAWING

Sub Code	: 10CED14 / 10CED24	IA Marks	: 25
Hrs/ Week	: 06 (Instruction 2 hr. + Sketching & Practice 4 hr.)	Exam Hours	: 03
Total Hrs.	: 84 (Instruction 28 hr. +Sketching & Practice 56 hr.)	Exam Marks	: 100

1. Introduction to Computer Aided Sketching

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering.

12 Hours

2. Orthographic Projections

Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems).

12 Hours

3. Orthographic Projections of Plane Surfaces (First Angle Projection Only)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates).

12 Hours

4. Projections of Solids (First angle Projection only)

Introduction, Definitions - Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on octahedrons and combination solid).

24 Hours

5. Sections And Development of Lateral Surfaces of Solids

Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids)

Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

12 Hours

6. Isometric Projection (Using Isometric Scale Only)

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).

12 Hours

Text Books:

1. **Engineering Drawing** - N.D. Bhatt & V.M. Panchal, 48th edition, 2005-Charotar Publishing House, Gujarat.
2. **A Primer on Computer Aided Engineering Drawing-2006**, Published by VTU, Belgaum.

Reference Books:

1. **Computer Aided Engineering Drawing** - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.
2. **Engineering Graphics** - K.R. Gopalakrishna, 32nd edition, 2005-Subash Publishers Bangalore.
3. **Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production**-Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005-Prentice-Hall of India Pvt. Ltd., New Delhi.
4. **Computer Aided Engineering drawing**- Prof. M. H. Annaiah, New Age International Publisher, New Delhi. 2009.

Conducting classes

Classes may be conducted in two slots/ week of 3 hours each (Instruction 1 hr. +Sketching & Practice 2 hr.)

Scheme of Evaluation for Internal Assessment (25 Marks)

1. 15 Marks for Class work (Sketching & Computer Aided Engineering drawing printouts in A4 size sheets).
2. 10 Marks for test in the same pattern as that of the main examination.(Better of the two Tests).

All the solutions must be valued on the spot by examining the sketches, display and the hard copies. All the sketches including the computer printouts must be submitted and they must be preserved for one year.

Scheme of Examination

1. Chapter 1 is only for practice and Internal Assessment and not for examination.
2. Separate Question paper must be set for each batch of students, jointly by the Internal & External examiners.
3. A maximum of **THREE** questions must be set as per the following pattern (*No mixing of questions from different Chapters*).

Q. No.	From Chapters	Marks Allotted
1	Chapter 2 or Chapter 3	30
2	Chapter 4	40
3	Chapter 5 or Chapter 6	30
Total		100

Scheme of Evaluation

Q. No.	Solutions & Sketching on graph book	Computer display & printout	Total Marks
1	10 Marks	20 Marks	30
2	15 Marks	25 Marks	40
3	15 Marks	15 Marks	30
Total	40 Marks	60 Marks	100

Students have to submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal & External examiners have to jointly evaluate the solutions (sketches) and computer display & printouts of each student for 100 marks (40 marks for solutions & sketches + 60 marks for computer display and printouts) and submit the marks list along with the solution (sketches) on graph sheets & computer printouts in separate covers.

4. Each batch must consist of a minimum of 10 students and a maximum of 12 students.
5. Examination can be conducted in parallel batches, if necessary.

BASIC ELECTRICAL ENGINEERING

Sub Code	: 10ELE15/ 10ELE25	IA Marks	: 25
Hrs/ Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART – A

UNIT-1

1-a) **D. C. Circuits:** Ohm's Law and Kirchhoff's Laws, analysis of series, parallel and series- parallel circuits excited by independent voltage sources. Power and Energy. Illustrative examples.

4Hours

1-b) **Electromagnetism:** Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced emf's. Concept of self inductance, mutual inductance and coefficient of coupling. Energy stored in magnetic field. Illustrative examples.

3Hours

UNIT-2

2.**Single-phase A.C. Circuits:** Generation of sinusoidal voltage, definition of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities. Analysis, with phasor diagrams, of R, L, C, R-L, R-C and R-L-C circuits, real power, reactive power, apparent power and power factor. Illustrative examples involving series, parallel and series- parallel circuits.

7 Hours

UNIT-3

3 **Three Phase Circuits:** Necessity and advantages of three phase systems, generation of three phase power, definition of Phase sequence, balanced supply and balanced load. Relationship between line and phase values of balanced star and delta connections. Power in balanced three-phase circuits, measurement of power by two-wattmeter method. Illustrative examples.

6 Hours

UNIT-4

4-a) **Measuring Instruments:** Construction and Principle of operation of dynamometer type wattmeter and single-phase induction type energy meter (problems excluded).

3 Hours

4-b) **Domestic Wiring:** Service mains, meter board and distribution board. Brief discussion on Cleat, Casing & Capping and conduit (concealed) wiring. Two-way and three-way control of a lamp. Elementary discussion on fuse and Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock –Earthing: Pipe and Plate.

3 Hours

PART – B

UNIT-5

5.**DC Machines:** Working principle of DC machine as a generator and a motor. Types and constructional features. emf equation of generator, relation between emf induced and terminal voltage enumerating the brush drop and drop due to armature reaction. Illustrative examples.

DC motor working principle, Back emf and its significance, torque equation. Types of D.C. motors, characteristics and applications. Necessity of a starter for DC motor. Illustrative examples on back emf and torque.

7 Hours

UNIT-6

6. **Transformers:** Principle of operation and construction of single-phase transformers (core and shell types). emf equation, losses, efficiency and voltage regulation (Open Circuit and Short circuit tests, equivalent circuit and phasor diagrams are excluded). Illustrative problems on emf equation and efficiency only.

7 Hours

UNIT-7

7. **Synchronous Generators:** Principle of operation. Types and constructional features. emf equation. Concept of winding factor (excluding derivation of distribution and pitch factors). Illustrative examples on emf. equation.

6 Hours

UNIT-8

8. **Three Phase Induction Motors:** Concept of rotating magnetic field. Principle of operation. Types and Constructional features. Slip and its significance. Applications of squirrel - cage and slip - ring motors. Necessity of a starter, star-delta starter. Illustrative examples on slip calculations.

6 Hours

Text Books:

1. "Basic Electrical Engineering", D C Kulshreshtha, TMH, 2009 Edition.
2. "Fundamentals of Electrical Engineering", Rajendra Prasad, PHI, Second Edition, 2009.

Reference Books:

- 1 "Electrical Technology", E. Hughes International Students 9th Edition, Pearson, 2005.
- 2 "Basic Electrical Engineering", Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, TMH, First reprint 2009.
- 3 Problems in Electrical Engineering, Parker Smith, CBS Publishers and Distributors, 9th Edition, 2003.

BASIC ELECTRONICS

Sub Code	: 10ELN15 / 10ELN25	IA Marks	: 25
Hrs/ Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART - A

UNIT-1

SEMICONDUCTOR DIODES AND APPLICATIONS: p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line, Temperature dependence of p-n characteristics, AC equivalent circuits, Zener diodes Half-wave diode rectifier, Ripple factor, Full-wave diode rectifier, Other full-wave circuits, Shunt capacitor filter - Approximate analysis of capacitor filters, Power supply performance, Zener diode voltage regulators, Numerical examples as applicable.

7 Hours

UNIT-2

TRANSISTORS: Bipolar Junction transistor, Transistor Voltages and currents, amplification, Common Base, Common Emitter and Common Collector Characteristics, DC Load line and Bias Point.

6 Hours

UNIT-3

BIASING METHODS: Base Bias, Collector to Base Bias, Voltage divider Bias, Comparison of basic bias circuits, Bias circuit design, Thermal Stability of Bias Circuits (Qualitative discussions only).

6 Hours

UNIT-4

OTHER DEVICES: Silicon Controlled Rectifier (S.C.R), SCR Control Circuits, More S.C.R applications; Unijunction transistor, UJT applications, Junction Field effect Transistors(Exclude Fabrication and Packaging), JFET Characteristics, FET Amplifications, Numerical examples as applicable.

7 Hours

PART - B

UNIT-5

AMPLIFIERS & OSCILLATORS: Decibels and Half power points, Single Stage CE Amplifier and Capacitor coupled two stage CE amplifier(Qualitative discussions only), Series voltage negative feedback and Additional effects of Negative feed back(Qualitative discussions only), The Barkhausen Criterion for Oscillations, BJT RC phase shift oscillator, Hartley, Colpitts and crystal oscillator (Qualitative discussions only) Numerical problems as applicable.

6 Hours

WORKSHOP PRACTICE

UNIT-6

INTRODUCTION TO OPERATIONAL AMPLIFIERS: Ideal OPAMP, Saturable property of an OP AMP, Inverting and Non Inverting OPAMP circuits, Need for OPAMP, Characteristics and applications - voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable Cathode Ray Oscilloscope (CRO).

6 Hours

UNIT-7

COMMUNICATION SYSTEMS: Block diagram, Modulation, Radio Systems, Superhetrodyne Receivers, Numerical examples as applicable

NUMBER SYSTEMS: Introduction, decimal system, Binary, Octal and Hexadecimal number systems, addition and subtraction, fractional number, Binary Coded Decimal numbers.

7 Hours

UNIT-8

DIGITAL LOGIC:, Boolean algebra, Logic gates, Half-adder, Full-adder, Parallel Binary adder.

7 Hours

Text Books:

1. Electronic Devices and Circuits: David. A. Bell; Oxford University Press, 5th Edn., 2008.

Reference Books:

1. Electronic Devices and Circuits: Jacob Millman, Christos C. Halkias TMH, 1991 Reprint 2001.
2. Electronic Communication Systems, George Kennedy, TMH 4th Edition.
3. Digital Logic and Computer Design, Morris Mano, PHI, EEE.
4. Basic Eelctronics, RD Sudhaker Samuel, U B Mahadevaswamy, V. Nattarsu, Saguine-Pearson, 2007.

Sub Code	: 10WSL16/ 10WSL26	IA Marks	: 25
Hrs/ Week	: 03	Exam Hours	: 03
Total Hrs.	: 42	Exam Marks	: 50

1. Fitting

- i. Study of fitting tools
- ii. Study of fitting operations & joints
- iii. Minimum 5 models involving rectangular, triangular, semi circular and dovetail joints.

2. Welding

- iv. Study of electric arc welding tools & equipments
- v. Minimum 4 Models- electric arc welding-Butt joint, Lap joint, T-joint & L-joint.

3. Study and demonstration of Sheet metal and soldering work.

4. Study & demonstration of power Tools in Mechanical Engineering

Scheme of Examination:

Fitting	30 Marks
Welding	10 Marks
Viva Voce	10 marks

Reference Book:

1. The Elements of Workshop Technology -, Vol 1 & 2, S.K.H. Choudhury, A.K.H.Choudhury, Nirjhar Roy, 11th edition, 2001, Media Promoters and Publishers, Mumbai.

Subject Code	: 10CPL16 / 10CPL26	IA Marks	: 25
Hrs/Week	: 03	Exam Hours	: 03
Total Hrs.	: 42	Exam Marks	: 50

PART – A

1. Design, develop and execute a program in C to find and output all the roots of a given quadratic equation, for non-zero coefficients.
 2. Design, develop and execute a program in C to implement Euclid's algorithm to find the GCD and LCM of two integers and to output the results along with the given integers.
 3. Design, develop and execute a program in C to reverse a given four digit integer number and check whether it is a palindrome or not. Output the given number with suitable messages.
 4. Design, develop and execute a program in C to evaluate the given polynomial $f(x) = a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$ for given value of x and the coefficients using Horner's method.
 5. Design, develop and execute a program in C to copy its input to its output, replacing each string of one or more blanks by a single blank.
 6. Design, develop and execute a program in C to input N integer numbers in ascending order into a single dimensional array and perform a binary search for a given key integer number and report success or failure in the form of a suitable message.
 7. Design, develop and execute a program in C to input N integer numbers into a single dimensional array, sort them in ascending order using bubble sort technique and print both the given array and the sorted array with suitable headings.
 8. Design, develop and execute a program in C to compute and print the word length on the host machine.

9. Design, develop and execute a program in C to calculate the approximate value of $\exp(0.5)$ using the Taylor Series expansion for the exponential function. Use the terms in the expansion until the last term is less than the machine epsilon defined by the header file `<float.h>`. Also print the value returned by the Mathematical function `exp()`.
 10. Design, develop and execute a program in C to read two matrices A (M x N) and B (P x Q) and compute the product of A and B if the matrices are compatible for multiplication. The program must print the input matrices and

PART – B

the resultant matrix with suitable headings and format if the matrices are compatible for multiplication, otherwise the program must print a suitable message. (For the purpose of demonstration, the array sizes M, N, P, and Q can all be less than or equal to 3)
 11. Design, develop and execute a parallel program in C to add, element-wise, two one-dimensional arrays A and B of N integer elements and store the result in another one-dimensional array C of N integer elements.
 12. Design and develop a function `rightrot(x, n)` in C that returns the value of the integer x rotated to the right by n bit positions as an unsigned integer. Invoke the function from the main with different values for x and n and print the results with suitable headings.
 13. Design and develop a function `isprime(x)` that accepts an integer argument and returns 1 if the argument is prime and 0 otherwise. The function must use plain division checking approach to determine if a given number is prime. Invoke this function from the main with different values obtained from the user and print appropriate messages.
 14. Design, develop and execute a parallel program in C to determine and print the prime numbers which are less than 100 making use of algorithm of the Sieve of Eratosthenes.
 15. Design and develop a function `reverses(s)` in C to reverse the strings s in place. Invoke this function from the main for different strings and print the original and reversed strings.
 16. Design and develop a function `match any(s1,s2)` which returns the first location in the string s1 where any character from the string s2 occurs, or -1 if s1 contains no character from s2. Do not use the standard library function which does a similar job! Invoke the function `match any(s1, s2)` from the main for different strings and print both the strings and the return value from the function `match any(s1,s2)`.
Note: In the practical examination, the student has to answer two questions. One question from Part A and one question from Part B will be selected by the student by lots. All the questions listed in the syllabus have to be included in the lots. The change of question (Part A only / Part B only / Both Part A & Part B) has to be considered, provided the request is made for the same, within half an hour from the start of the examination. The allotment of marks is as detailed below:

Sl. No.	Activity	Max. Marks
1.	Procedure Writing program & procedure for the assigned problems along with algorithms / flowchart	5*
2.	Conduction of the program and	Part A
		Part B
		10

	showing the results in proper format	Part B	20
3.	Viva-voce**		10
Total Max. Marks			50
Minimum passing Marks (40% of Max. Marks)			20

* To be considered as zero if student has been allowed change of question.

LABORATORY EXPERIMENTS IN ENGINEERING PHYSICS

Sub Code	: 10PHYL17/10PHYL27	IA Marks	: 25
Hrs/ Week	: 03	Exam Hours	: 03
Total Hrs.	: 10 (To be completed)	Exam Marks	: 50

EXPERIMENTS :

1. Series & Parallel LCR Circuits.(Determination of resonant frequency & quality factor)
2. I-V Characteristics of Zener Diode.(determination of knee voltage, zener voltage & forward resistance)
3. Characteristics of a Transistor.(Study of Input & Output characteristics and calculation of input resistance, output resistance & amplification factor)
4. Photo Diode Characteristics.(Study of I-V characteristics in reverse bias and variation of photocurrent as a function of reverse voltage & intensity)
5. Ultrasonic Interferometer (Measurement of velocity of sounds in solids/liquids).
6. Dielectric constant (Measurement of dielectric constant).
7. Magnetic properties (Study of retentivity and coercivity by B-H graph method).
8. Diffraction (Measurement of wavelength of laser / Hg source using diffraction grating).
9. Planck's constant (Using the principle of photoelectric effect/LED's).
10. Electrical Resistivity (Determination of resistivity in semiconductor by Four probe method).
11. Verification of Stefan's law.
12. Determination of Fermi energy.(Measurement of Fermi energy in copper)
13. Uniform Bending Experiment.(Determination of Youngs modulus of material bar)
14. Newtons Rings.(Determination of radius of curvature of planoconvex lens)

ENGINEERING CHEMISTRY LABORATORY

Sub Code	: 10CHEL17/10CHEL27	IA Marks	: 25
Hrs/ Week	: 03	Exam Hours	: 03
Total Hrs.	: 42	Exam Marks	: 50

PART – A

1. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution
2. Colorimetric estimation of Copper
3. Conductometric estimation of an Acid mixture using standard NaOH solution
4. Flame Photometric estimation of Sodium and Potassium in the given sample of Water
5. Determination of pKa of a weak acid using pH Meter
6. Determination of Viscosity co-efficient of a given liquid using Ostwald's Viscometer.

PART – B

1. Determination of Total Hardness of a sample of Water using Disodium salt of EDTA.
2. Determination of CaO in the given sample of Cement by Rapid EDTA method.
3. Determination of Percentage of Copper in Brass using standard Sodium thiosulphate solution.
4. Determination of Iron in the given sample of Haematite ore solution using Potassium dichromate Crystals by external indicator method.
5. Determination of COD of the given Industrial Waste water sample.
6. Determination of Total Alkalinity of a given Water Sample using standard Hydrochloric acid.

References Books:

- 1) Laboratory manual in Engineering Chemistry Sudharani, Dhanpatrai Publishing Company.
- 2) Vogel's Text Book of Quantitative Chemical Analysis revised by G.H.Jeffery, J. Bassett, J. Mendham and R.C Denney.

Scheme of Examination:

One experiment from Part- A and another from Part - B shall be set. Different experiments may be set from Part- A and a common experiment from Part – B.

CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS

Sub Code	: 10CIP18/10CIP28	IA Marks	: 25
Hrs/ Week	: 02	Exam Hours	: 02
Total Hrs.	: 26	Exam Marks	: 50

- 1 Preamble to the constitution of India. Fundamental rights under Part – III – details of Exercise of rights, Limitations & Important cases. **4 Hours**
- 2 Relevance of Directive principles of State Policy under Part – IV. Fundamental duties & their significance. **3 Hours**
- 3 Union Executive – President, Prime Minister, Parliament & the Supreme Court of India. **3 Hours**
- 4 State executive – Governors, Chief Minister, State Legislator and High Courts. **3 Hours**
- 5 Constitutional Provisions for Scheduled Castes & Tribes, Women & Children & Backward classes. Emergency Provisions. **4 Hours**
- 6 Electoral process, Amendment procedure, 42nd, 44th, 74th, 76th, 86th and 91st Constitutional amendments. **3 Hours**
- 7 Scope & aims of engineering Ethics. Responsibility of Engineers. Impediments to responsibility. **3 Hours**
- 8 Honesty, Integrity and reliability, risks, safety & liability in engineering. **3 Hours**

Text Books:

1. Durga Das Basu: "Introduction to the Constitution of India" (Students Edn.) Prentice – Hall EEE, 19th/20th Edn., 2001.
2. "Engineering Ethics" by Charles E.Haries, Michael. S.Pritchard and Michael J.Robins Thompson Asia, 2003-08-05.

Reference Books:

1. "An Introduction to Constitution of India" by M.V.Pylee, Vikas Publishing, 2002.
2. "Engineering Ethics" by M. Govindarajan, S.Natarajan, V.S. Senthikumar., Prentice – Hall of India Pvt. Ltd. New Delhi, 2004.

Scheme of examination:

Question paper is of objective type. Students have to pass this subject compulsorily. However, marks will not be considered for awarding class/rank.

ENVIRONMENTAL STUDIES

Sub Code	: 10CIV18/10CIV28	IA Marks	: 25
Hrs/ Week	: 02	Exam Hours	: 02
Total Hrs.	: 26	Exam Marks	: 50

PART – A

UNIT-1

Environment - Definition, Eco system -- Balanced ecosystem, Human activities - Food, Shelter, Economic and Social Security

3 Hours

UNIT-2

Effects of human activities on environment - Agriculture, Housing, Industry, Mining, and Transportation activities, Environmental Impact Assessment. Sustainable Development.

3 Hours

UNIT-3

Natural Resources - Water resources - Availability and Quality aspects. Water borne diseases, Water induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material Cycles - Carbon, Nitrogen and Sulphur Cycles.

4 Hours

UNIT-4

Energy - Different types of energy, Electro-magnetic radiation. Conventional and Non - Conventional sources - Hydro Electric, Fossil fuel based, Nuclear, Solar, Biomass and Bio-gas. Hydrogen as an alternative future source of Energy.

4 Hours

PART – B

UNIT-5

Environmental Pollution and their effects. Water pollution. Land pollution . Noise pollution . Public Health aspects.

3 Hours

UNIT-6

Current Environmental issues of importance: Population Growth, Climate change and Global warming - Effects, Urbanization, Automobile pollution

3 Hours

UNIT-7

Acid Rain, Ozone layer depletion, Animal Husbandry

3 Hours

UNIT-8

Environmental Protection - Role of Government, Legal aspects, Initiatives by Non - Governmental Organizations (NGO), Environmental Education, Women Education.

3 Hours

Question paper is of objective type for 50 marks (**Fifty questions have to be set with 4 multiple choice answers**). Students have to pass the subject compulsorily. However, marks will not be considered for awarding class/rank.

Text Books:

- 1) Benny Joseph (2005), "Environmental Studies", Tata McGraw - Hill Publishing Company Limited
- 2) Ranjit Daniels R.J. and Jagdish Kirshnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi
- 3) Rajagopalan R. (2005), "Environmental Studies – From Crisis to Cure", Oxford University Press

Reference Books:

- 1) Raman Sivakumar, (2005), "Principles of Environmental Science and Engineering", Second Edition, Cengage learning, Singapore
- 2) Meenakshi P. (2006), "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi
- 3) Prakash S.M. (2007), "Environmental Studies", Elite Publishers, Mangalore
- 4) Erach Bharucha (2005), "Text Book of Environmental Studies", for UGC, University Press
- 5) Tyler Miller Jr. G. (2004), "Environmental Science – Working with the Earth", Tenth Edition, Thomson Brooks/Cole
- 6) Tyler Miller Jr. G. (2006), "Environmental Science – Working with the Earth", Eleventh Edition, Thomson Brooks/Cole
- 7) "Text Book of Environmental and Ecology" by Dr. Pratibha Sing, Dr. Anoop Singh and Dr. Piyush Malaviya. Acme Learning Pvt. Ltd., New Delhi.

ENGINEERING MATHEMATICS – II

Sub Code	: 10MAT21	IA Marks	: 25
Hrs/ Week	: 04	Exam Hours	: 03
Total Hrs.	: 52	Exam Marks	: 100

PART-A

UNIT-1

Differential Equations - 1

Equations of first order and higher degree (p-y-x equations), Equations solvable for p-y-x. General and singular solutions, Clairaut's equation. Applications of differential equations of first order—illustrative examples*.

6 Hours

UNIT-2

Differential Equations – 2

Linear differential equations: Solution of second and higher order equations with constant coefficients by inverse differential operator method. Simultaneous differential equations of first order – Applications.

7 Hours

UNIT-3

Differential Equations – 3

Method of variation of parameters, Solutions of Cauchy's and Legendre's linear equations, Series solution of equations of second order, Frobenius method – simple problems.

6 Hours

UNIT-4

Partial Differential Equations (PDE)

Formation of Partial differential equations (PDE) by elimination of arbitrary constants/ functions. Solution of non-homogeneous PDE by direct integration. Solution homogeneous PDE involving derivative with respect to one independent variable only. Solution of Lagrange's linear PDE. Solution of PDE by the Method of separation of variables (first and second order equations)

7 Hours

PART-B

UNIT-5

Integral Calculus

Multiple Integrals – Evaluation of Double integrals and triple integrals. Evaluation of double integrals over a given region, by change of order of integration, by change of variables. Applications to area and volume – illustrative examples*.

Beta and Gamma Functions - Properties and problems

6 Hours

UNIT-6

Vector Integration

Line integrals – definition and problems, Surface and volume integrals-definition. Green's theorem in a plane, Stoke's and Gauss divergence theorem (statements only).

6 Hours

UNIT-7

Laplace Transforms-1

Definition, transforms of elementary functions, properties, Periodic function, Unit step function and unit impulse function.

7 Hours

UNIT-8

Laplace Transforms-2

Inverse Laplace Transforms, Convolution theorem, solution of linear differential equations using Laplace transforms. Applications – illustrative examples*.

7 Hours

Note: * In the case of illustrative examples, questions are not to be set.

Text Books:

- 1) B.S. Grewal, Higher Engineering Mathematics, Latest edition, Khanna Publishers.
- 2) Erwin Kreyszig, Advanced Engineering Mathematics, Latest edition, Wiley Publications.

Reference Book:

- 1) B.V. Ramana, Higher Engineering Mathematics, Latest edition, Tata Mc. Graw Hill Publications.
- 2) Peter V. O'Neil, Engineering Mathematics, CENGAGE Learning India Pvt Ltd. Publishers.

FUNCTIONAL ENGLISH

Introduction	Importance of Languages	5 Hours
Grammar	Parts of Speech, Usage of Preposition and Article, Punctuation	3 Hours
Tenses & Degrees of Comparison		5 Hours
Transformation of Sentences	Active-Passive, Affirmative-Negative, Exclamatory-Assertive, Interrogative-Assertive, Kinds of sentences	5 Hours
Direct-Indirect Speech		7 Hours
Vocabulary Usage	Homonyms, Correcting Spelling, One-word equivalents	3 Hours
Precis Writing		5 Hours
Essay/Report Writing		5 Hours
Letter Writing	Personal, Official, Applications	5 Hours
Idioms & Phrases	Meaning & Usage in sentences	5 Hours
Comprehension	Of an unseen passage	2 Hours
Elaboration	Expansion of ideas, proverbs	2 Hours
Presentation	Preparation of materials and presentation – step	3 Hours

Suggested Text Books:

- 1) Basic Grammar, SLN Sharma & K Shankaranarayana, Navakarnataka Publications.
- 2) New International Business English by Jones, published by Cambridge University Press.

Reference Books:

- 1) English Rank Scorer, G. Sankaran, Addone Publishing group, Thiruvananthapuram, Kerala
- 2) English Grammar, Wren & Martin
- 3) Oxford Guide to Speaking and Writing by John Seely, 2000

KANNADA KALI

SYLLABUS

Lesson 1 :	Introducing each other – 1. Personal Pronouns, Possessive forms, Interrogative words.
Lesson 2 :	Introducing each other – 2. Personal Pronouns, Possessive forms, Yes/No Type Interrogation
Lesson 3 :	About Ramanaya. Possessive forms of nouns, dubitative question, Relative nouns
Lesson 4 :	Enquiring about a room for rent. Qualitative and quantitative adjectives.
Lesson 5 :	Enquiring about the college. Predicative forms, locative case.
Lesson 6 :	In a hotel Dative case defective verbs.
Lesson 7 :	Vegetable market. Numeral, plurals.
Lesson 8 :	Planning for a picnic. Imperative, Permissive, hortative.
Lesson 9 :	Conversation between Doctor and the patient. Verb- iru, negation – illa, non – past tense.
Lesson 10:	Doctors advise to Patient. Potential forms, no – past continuous.
Lesson 11:	Discussing about a film. Past tense, negation.
Lesson 12:	About Brindavan Garden. Past tense negation.

- Lesson 13: About routine activities of a student.
Verbal Participle, reflexive form, negation.
- Lesson 14: Telephone conversation.
Past and present perfect past continuous and their negation.
- Lesson 15: About Halebid, Belur.
Relative participle, negation.
- Lesson 16: Discussing about examination and future plan.
Simple conditional and negative
- Lesson 17: Karnataka (Lesson for reading)
- Lesson 18: Kannada Bhaashe (Lesson for reading)
- Lesson 19: Mana taruva Sangati alla (Lesson for reading)
- Lesson 20: bEku bEDagaLu (lesson for reading)

ಕನ್ನಡ ಮನಸು

- ೧) ಶ್ರಾವಣ (ಕವನ) ದ.ರಾ.ಬೇಂದ್ರೆ
- ೨) ಡಾ. ವಿಶ್ವೇಶ್ವರಯ್ಯ ವ್ಯಕ್ತಿ ಮತ್ತು ಬಹಿಷ್ಕಾರ (ವ್ಯಕ್ತಿಚಿತ್ರ) ಎ.ಎಸ್. ಮೂರ್ತಿರಾವ್
- ೩) ದೋಣಿ ಪರಿಗೋಲುಗಳಲ್ಲಿ (ಪ್ರವಾಸ ಕಥನ) ಶಿವರಾಮ ಕಾರಂತ
- ೪) ಅಣ್ಣಪ್ಪನ ರೇಷ್ಮೆ ಕಾಯಿಲೆ (ಪ್ರಬಂಧ) ಕುವೆಂಪು
- ೫) ನಮ್ಮ ವಿಮೆಗೆ ಮತ್ತು ತಿಳಿಯುವುದೇ (ವಿನೋದ) ಗೋರೂರು ರಾಮಸ್ವಾಮಿ
ಆಯ್ಯಂಗಾರ್
- ೬) ಆನೆಹಳ್ಳದಲ್ಲಿ ಹುಡುಗಿಯರು(ವಿಜ್ಞಾನ ಲೇಖನ) ಬಿ.ಬಿ.ಎಲ್ ಸ್ವಾಮಿ
- ೭) ಬೆಡ್ ನಂ. ಏಳು (ಕತೆ) ತ್ರಿವೇಣಿ
- ೮) ರೋಟ್ಟಿ ಮತ್ತು ಕೋಪಿ (ಕವನ) ಸು.ರಂ.ವಿಕ್ಕಂಡಿ
- ೯) ಗುಬ್ಬಚ್ಚಿ ಗೋಡು (ಅಂಕಂ ಬರಹ) ಲಂಕೇಶ್
- ೧೦) ಚೀಂಕ್ರ ಮೇಸ್ತ್ರಿ ಮತ್ತು ಹಾವುಮೀನು (ಪರಿಚಯ ಲೇಖನ) ಕೆ.ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ
- ೧೧) ಗಾಂಧಿ (ಕತೆ) ಬೆಸಗರಹಳ್ಳಿ ರಾಮಣ್ಣ
- ೧೨) ಬೆಲ್ಚಿಯ ಹಾಡು (ಕವನ) ಸಿದ್ದಲಿಂಗಯ್ಯ
- ೧೩) ಎಲ್ಲ ಹುಡುಗಿಯರ ಕನಸು (ಕವನ) ಸಮಿತಾ ನಾಗಭೂಷಣ
- ೧೪) ನೀರು (ಕತೆ) ಬಸವರಾಜ ಕುಕ್ಕರಹಳ್ಳಿ
- ೧೫) ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿಯ ಸ್ಮರಣೆ (ಪರಿಚಯ ಲೇಖನ) ರಹಮತ ತರೀಕೆರೆ
- ೧೬) ತಂತ್ರಜ್ಞಾನ ಕಲಿಕೆಯಲ್ಲಿ ಭಾಷೆ (ತಂತ್ರಜ್ಞಾನ ಬರಹ) ಎಸ್.ಸುಂದರ್
- ೧೭) ಕೋಣವೇಗೋಡ (ಕಾವ್ಯ) ಜಾನಪದ
