



**RAMAIAH**  
Institute of Technology

# **CURRICULUM**

**Academic year 2020 - 2021**

**I & II Semester**

**COMMON TO ALL BRANCHES**

**RAMAIAH INSTITUTE OF TECHNOLOGY**  
(Autonomous Institute, Affiliated to VTU)  
Bangalore - 560054.

## About the Institute:

Dr. M. S. Ramaiah a philanthropist, founded ‘Gokula Education Foundation’ in 1962 with an objective of serving the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 13 UG programs and 15 PG programs. All these programs are approved by AICTE. All the UG programs & 09 PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with ‘A’ grade by NAAC in 2014. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs till the year 2029. The institute is a participant to the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 60% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility to all faculty members, all research departments active with sponsored funded projects and more than 300 scholars pursuing Ph.D. To promote research culture, the institute has established Centre of Excellence for Imaging Technologies, Centre for Advanced Materials Technology & Schneider Centre of Excellence. **M S Ramaiah Institute of Technology has obtained “Scimago Institutions Rankings” All India Rank 65 & world ranking 578 for the year 2020.**

The Centre for Advanced Training and Continuing Education (CATCE), and Entrepreneurship Development Cell (EDC) have been set up on campus to incubate startups. **M S Ramaiah Institute of Technology secured All India Rank 8<sup>th</sup> for the year 2020 for Atal Ranking of Institutions on Innovation Achievements (ARIIA), an initiative of Ministry of Human Resource Development (MHRD), Govt. of India.** MSRIT has a strong Placement and Training department with a committed team, a good Mentoring/Proctorial system, a fully equipped Sports department, large air-conditioned library with good collection of book volumes and subscription to International and National Journals. The Digital Library subscribes to online e-journals from Elsevier Science Direct, IEEE, Taylor & Francis, Springer Link, etc. MSRIT is a member of DELNET, CMTI and VTU E-Library Consortium. MSRIT has a modern auditorium and several hi-tech conference halls with video conferencing facilities. It has excellent hostel facilities for boys and girls. MSRIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association.

**As per the National Institutional Ranking Framework, MHRD, Government of India, M S Ramaiah Institute of Technology has achieved 59<sup>th</sup> rank among 1071 top Engineering institutions of India for the year 2020 and 1<sup>st</sup> rank amongst Engineering colleges (VTU) in Karnataka.**

## **About the Departments:**

### **DEPARTMENT OF MATHEMATICS:**

The major focus of the department is to inculcate mathematical thinking in engineering students. For this, we teach core mathematics courses to students at undergraduate and postgraduate level as well as offer electives in mathematics. The department has a staff strength of 21 members. At present, there are 20 Ph.D. holders. Current expertise of the faculty covers a broad range of areas including Fluid mechanics, Linear Algebra, Numerical Methods, Number Theory, Probability, Statistics and Queuing Theory. The department faculty have published many papers in national and international journals. In addition, the faculty members have also obtained extramural support to carry out research activities and projects sponsored by VTU, UGC, DST and TEQIP.

### **DEPARTMENT OF PHYSICS:**

Physics department of RIT has well qualified and motivated faculty members who are actively engaged in teaching and research work. Majority of them have more than 15 years of teaching and 10 years of research experience. The Department has very good infrastructure, well equipped spacious laboratories, computational and research facilities. Five PhDs have been awarded from the R & D centre of Physics department till now. Five research projects with external funding to the tune of Rs. 50 lakhs from BRNS and VGST have been successfully completed. Two VGST funded projects are ongoing. In last one year, 32 research papers have been published in International peer reviewed journals with high impact factor. Total research publications in National / International Journals from 2008 to till date is 170.

### **DEPARTMENT OF CHEMISTRY:**

The Chemistry Department is one of the oldest Departments (established in 1962) of Ramaiah Institute of Technology. The Department consists of ten well qualified and experienced faculty members. The Department also has five non-teaching staff. The Department aims at preparing the students for careers in all the fields of engineering aspects and also carry out basic and applied research work. The main activity of the

department is to teach engineering chemistry theory and Laboratory courses to the under graduate engineering students of all disciplines. Department is also involved in teaching Technical chemistry for III semester BE chemical engineering students, along with respective laboratory and also handling open electives for higher semester students. The department is a recognized research centre by VTU. All faculty members are actively engaged in research work. Fifteen research scholars have registered for Ph.D and awarded 13 PhD's. The faculty members of the Department have published about 50 research papers in reputed international journals in the current academic year. The department has conducted two FDP programs and conducting zero-budget programs regularly for Research scholars.

### **DEPARTMENT OF HUMANITIES:**

The Department of Humanities has six faculty members, with one being a doctorate. The department engages in teaching Professional Communication and Life Skills, Constitution of India, Kannada, Communication skills for BE/BArch students. Apart from this the department runs special classes/bridge courses in Communicative English to train NRI and rural students in English language usage. The faculty members engage in teaching-learning activities, research publications and conducting workshops for students to build social skills and broaden critical and creative competencies.

The department is also equipped with an English Language lab located in LHC block. First Year BE students take this course as a part of the subject 'Professional Communication and Life Skills'. Building Vocabulary, grammar, Listening, Speaking skills, Power Point presentations and Group activities form integral part of the course.

## **VISION OF THE INSTITUTE**

To be an Institution of International Eminence, renowned for imparting quality technical education, cutting edge research and innovation to meet global socio-economic needs

## **MISSION OF THE INSTITUTE**

RIT shall meet the global socio-economic needs through

- Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization
- Establishing research clusters in emerging areas in collaboration with globally reputed organizations
- Establishing innovative skills development, techno entrepreneurial activities and consultancy for socio-economic needs

## **QUALITY POLICY**

We at Ramaiah Institute of Technology strive to deliver comprehensive, continually enhanced, global quality technical and management education through an established Quality Management System complemented by the synergistic interaction of the stake holders concerned

## **VISION & MISSION OF THE DEPARTMENTS:**

### **DEPARTMENT OF MATHEMATICS**

#### **Vision**

To mould the students to have strong Mathematical and analytical skills to meet the challenges open to them

#### **Mission**

To provide the students with a strong Mathematical foundation through course which cater to the needs of industry, research and higher education.

## **DEPARTMENT OF CHEMISTRY**

### **Vision**

Department strives for development of curriculum viewing emerging trends in technology with a balanced approach towards Institute Industry interaction and academic excellence along with research in basic sciences.

### **Mission**

Providing outstanding teaching and quality training in chemistry to all students at all levels and in all disciplines and also develop and maintain research programs of national and international relevance and serve the society through unique expertise and talent found in the department.

## **DEPARTMENT OF PHYSICS**

### **Vision**

To develop undergraduate courses of best academic standards comparable to universities of international repute and be a catalytic agent to help students to manifest their latent potential.

### **Mission**

To provide the best training through teaching and research to enable the students to master the concepts in physics and apply successfully to real time problems and kindle their interest in cutting edge research areas.

## **DEPARTMENT OF HUMANITIES**

### **Vision**

The department of Humanities, RIT aspires to achieve excellence in teaching and training the young engineering students in the areas of humanities and social sciences through outcome based quality education and nurture them to emerge as professional leaders, lifelong learners and responsible citizens of global community.

### **Mission**

The mission of the department is to offer courses that aim to strengthen the students' creative and critical thinking, problem solving abilities, communication skills and broaden intellectual perspectives, to understand and deal with social realities through continuous learning experiences.

## PROGRAM OUTCOMES (POs):

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems:** Use research - based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## Faculty List:

- **Department of Mathematics**

Sl. No.	Name	Qualification	Designation
1.	Dr. N L Ramesh	M.Sc., Ph.D.	Professor & Head I Year Coordinator
2.	Dr. S H C V Subbabhata	M.Sc., M.Phil, Ph.D.	Professor
3.	Dr. G Neeraja	M.Sc., Ph.D.	Professor
4.	Dr. Monica Anand	M.Sc., Ph.D.	Associate Professor
5.	Dr. Dinesh P A	M.Sc., M.Sc(IT), M.Phil., Ph.D.	Associate Professor
6.	Dr. M V Govindaraju	M.Sc., Ph.D.	Assistant Professor
7.	Dr. Vijaya Kumar	M.Sc., Ph.D.	Assistant Professor
8.	Dr. A Sreevallabha Reddy	M.Sc., Ph.D.	Assistant Professor
9.	Dr. R Suresh Babu	M.Sc., Ph.D.	Assistant Professor
10.	Dr. M S Basava Raj	M.Sc., Ph.D.	Assistant Professor
11.	Mr. B Azghar Pasha	M.Sc (Ph.D.)	Assistant Professor
12.	Dr. Aruna A S	M.Sc Ph.D.	Assistant Professor
13.	Dr. Girinath Reddy M	M.Sc., Ph.D.	Assistant Professor
14.	Dr. Uma M	M.Sc., Ph.D.	Assistant Professor
15.	Dr. S Ram Prasad	M.Sc., Ph.D.	Assistant Professor
16.	Dr. Kavitha N	M.Sc., Ph.D.	Assistant Professor
17.	Dr. Sushma S	M.Sc., Ph.D.	Assistant Professor
18.	Dr. Kalyan Chakravarthy Y S	M.Sc., Ph.D.	Assistant Professor
19.	Dr. Sheshi Prabha Gogate S	M.Sc., Ph.D.	Assistant Professor
20.	Dr. Praveena M M	M.Sc., Ph.D.	Assistant Professor
21.	Dr. Veena B N	M.Sc., Ph.D.	Assistant Professor



- Department of Physics**

<b>Sl. No.</b>	<b>Name</b>	<b>Qualification</b>	<b>Designation</b>
1.	Dr. A. Jagannatha Reddy	M.Sc., M.Phil, Ph.D.	Professor & Head
2.	Dr. Seema Agarwal	M.Sc., M.Phil, Ph.D.	Associate Professor
3.	Dr. Ravindra M Melavanki	M.Sc., Ph.D.	Assistant Professor
4.	Dr. K. L. Sandhya	M.Sc., Ph.D.	Assistant Professor
5.	Dr. Nagesh B V	M.Sc., Ph.D.	Assistant Professor
6.	Dr. G. N. Anil Kumar	M.Sc., Ph.D.	Assistant Professor
7.	Dr. B.Siddlingeshwar	M.Sc., Ph.D.	Assistant Professor
8.	Dr. S. Vajjayanthimala	M.Sc., Ph.D.	Assistant Professor
9.	Dr. Kalpana Sharma	M.Sc., Ph.D.	Assistant Professor
10.	Ms. Gopika C	M.Sc.	Teaching assistant

- Department of Chemistry**

<b>Sl. No.</b>	<b>Name</b>	<b>Qualification</b>	<b>Designation</b>
1.	Dr. B. M. Nagabushana	M.Sc., Ph.D.	Professor & Head
2.	Prof. B.S. Durgakeri	M.Sc.	Visiting Professor
3.	Dr. Nagaraju Kottam	M.Sc., Ph.D.	Associate Professor
4.	Dr. M. N. Manjunatha	M.Sc., Ph.D.	Assistant Professor
5.	Dr. P. Murali Krishna	M.Sc., Ph.D.	Assistant Professor
6.	Dr. Basappa C Yallur	M.Sc., Ph.D.	Assistant Professor
7.	Dr. Malathi Challa	M.Sc., Ph.D.	Assistant Professor
8.	Dr. Sharanabasappa Patil	M.Sc., Ph.D.	Assistant Professor
9.	Dr. R. Hari Krishna	M.Sc., Ph.D.	Assistant Professor
10.	Dr. Sharath D	M.Sc., Ph.D.	Research Scientist

- **Department of Humanities**

<b>Sl. No.</b>	<b>Name</b>	<b>Qualification</b>	<b>Designation</b>
1.	Dr. Premila Swamy D	MA, UGC NET, Ph.D.	Asst Professor & I/C HOD
2.	Mrs. Kanya Kumari S	MA, M.Phil	Assistant Professor
3.	Mr. Uday Kumar H M	MA, MBA, (Ph.D.)	Assistant Professor
4.	Mrs. Sukanya N	MA	Part time lecturer
5.	Mrs. Nimmy V.S	L.L.M	Part time lecturer
6.	Mrs. Kiran Amar Magavi	MA, MHRM (Ph.D.)	Part time lecturer

**Semester wise credit breakdown for B E Degree Curriculum**

**Batch 2020-24**

<b>Semester</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>	<b>Sixth</b>	<b>Seventh</b>	<b>Eighth</b>	<b>Total Credits</b>
<b>Course Category</b>									
<b>Basic Sciences (BSC)</b>	9	8	4	4					25
<b>Engineering Sciences (ESC)</b>	11	10							21
<b>Humanities, Social Sciences and Management (HSMC)</b>	2	2			3		3		10
<b>Professional Courses - Core (PCC)</b>			21	21	15	11	10		78
<b>Professional Courses – Elective (PEC)</b>					3	6	6		15
<b>Other Open Elective Courses (OEC)</b>					3	3			6
<b>Project Work (PROJ), Internship (IN)</b>						4	1	15	20
<b>Total Credits</b>	22	20	25	25	24	24	20	15	175

**SCHEME OF TEACHING  
I SEMESTER B.E.**

Branches: CS, EC, IT, CH, ML and IS PHYSICS CYCLE

SL. No.	Course Code	Course Title	Teaching Department	Credits			Contact Hours	
				L	T	P		
1.	MA11	Engineering Mathematics – I	Mathematics	3	1	0	4	5
2.	PY12	Engineering Physics	Physics	3	1	0	4	5
3.	ME13	Elements of Mechanical Engineering	Mechanical Engineering	3	0	0	3	3
4.	CV14	Basics of Civil Engineering and Mechanics	Civil Engineering	3	0	0	3	3
5.	EC15	Basic Electronics	Electronics, Telecommunication, Instrumentation, Medical electronics	3	0	0	3	3
6.	HS16*	Environmental Studies	Civil Engineering	0	0	0	0	2
7.	HS17	Kannada	Humanities	2	0	0	2	2
8.	PYL18	Engineering Physics Laboratory	Physics	0	0	1	1	2
9.	MEL19	Workshop Practice	Mechanical Engineering	0	1	1	2	4
<b>Total</b>				<b>17</b>	<b>3</b>	<b>2</b>	<b>22</b>	<b>29</b>

\* Non Credit Mandatory Course      L – Lecture (one hour)      T - Tutorial (Two hours)      P - Practical (Two hours)

## II SEMESTER B.E

Sl. No.	Course Code	Course Title	Teaching Department	Credits			Contact Hours	
				L	T	P		Total
1.	MA21	Engineering Mathematics – II	Mathematics	3	1	0	4	5
2.	CY22	Engineering Chemistry	Chemistry	3	0	0	3	3
3.	HS23*	Constitution of India	Humanities	0	0	0	0	2
4.	HS24	Professional Communication & Life Skills	Humanities	2	0	0	2	2
5.	EE25	Basic Electrical Engineering	Electrical & Electronics	2	1	0	3	4
6.	CS26	Fundamentals of Computing	Computer Science / Information Science	2	0	0	2	2
7.	CYL27	Engineering Chemistry Laboratory	Chemistry	0	0	1	1	2
8.	CSL28	Fundamentals of Computing & C Programming Laboratory	Computer Science / Information Science	0	1	1	2	4
9.	ME29	Computer Aided Engineering Drawing	Mechanical Engineering	0	1	1	2	4
10.	AL21	Engineering Design	Respective Departments	0	0	1	1	2
<b>Total</b>				<b>12</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>30</b>

\* Non Credit Mandatory Course      L – Lecture (one hour)      T – Tutorial (Two hours)      P – Practical (Two hours)

**Note:**

**AICTE Activity Points to be earned by students admitted to BE program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):**

Every regular student, who is admitted to the 4 year degree program, is required to earn 100 activity points in addition to the total credits earned for the program. Students entering 4 years Degree Program through lateral entry are required to earn 75 activity points in addition to the total credits earned for the program. The activity points earned by the student shall be reflected on the students 8th Semester grade card. The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled. Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.

Incase student fail to earn the prescribed activity points, Eight semester Grade Card shall be issued only after earning the required activity Points. Students shall be eligible for the award of degree only after the release of the Eight Semester grade card.

## SCHEME OF TEACHING I SEMESTER B.E.

**Branches:** ME, IM, TC, CV, EE and BT

**CHEMISTRY CYCLE**

Sl. No.	Course Code	Course Title	Teaching Department	Credits			Contact Hours	
				L	T	P		Total
1.	MA11	Engineering Mathematics – I	Mathematics	3	1	0	4	5
2.	CY12	Engineering Chemistry	Chemistry	3	0	0	3	3
3.	HS13*	Constitution of India	Humanities	0	0	0	0	2
4.	HS14	Professional Communication & Life Skills	Humanities	2	0	0	2	2
5.	EE15	Basic Electrical Engineering	Electrical & Electronics	2	1	0	3	4
6.	CS16	Fundamentals of Computing	Computer Science / Information Science	2	0	0	2	2
7.	CYL17	Engineering Chemistry Laboratory	Chemistry	0	0	1	1	2
8.	CSL18	Fundamentals of Computing & C Programming Laboratory	Computer Science / Information Science	0	1	1	2	4
9.	ME19	Computer Aided Engineering Drawing	Mechanical Engineering	0	1	1	2	4
10.	AL11	Engineering Design	Respective Departments	0	0	1	1	2
<b>Total</b>				<b>12</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>30</b>

\* Non Credit Mandatory Course    L – Lecture (one hour)    T - Tutorial (Two hours)    P - Practical (Two hours)

## II SEMESTER

Sl. No.	Course Code	Course Title	Teaching Department	Credits			Contact Hours	
				L	T	P		
1.	MA21	Engineering Mathematics – II	Mathematics	3	1	0	4	5
2.	PY22	Engineering Physics	Physics	3	1	0	4	5
3.	ME23	Elements of Mechanical Engineering	Mechanical Engineering	3	0	0	3	3
4.	CV24	Basics of Civil Engineering and Mechanics	Civil Engineering	3	0	0	3	3
5.	EC25	Basic Electronics	Electronics, Telecommunication, Instrumentation, Medical electronics	3	0	0	3	3
6.	HS26*	Environmental Studies	Civil Engineering	0	0	0	0	2
7.	HS27	Kannada	Humanities	2	0	0	2	2
8.	PYL28	Engineering Physics Laboratory	Physics	0	0	1	1	2
9.	MEL29	Workshop Practice	Mechanical Engineering	0	1	1	2	4
<b>Total</b>				<b>17</b>	<b>3</b>	<b>2</b>	<b>22</b>	<b>29</b>

\* Non Credit Mandatory Course    L – Lecture (one hour)    T - Tutorial (Two hours)    P - Practical (Two hours)

**Note:**

**AICTE Activity Points to be earned by students admitted to BE program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):**

Every regular student, who is admitted to the 4 year degree program, is required to earn 100 activity points in addition to the total credits earned for the program. Students entering 4 years Degree Program through lateral entry are required to earn 75 activity points in addition to the total credits earned for the program. The activity points earned by the student shall be reflected on the students 8th Semester grade card. The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled. Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.

Incase student fail to earn the prescribed activity points, Eight semester Grade Card shall be issued only after earning the required activity Points. Students shall be eligible for the award of degree only after the release of the Eight Semester grade card.

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## ENGINEERING MATHEMATICS – I

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Course Code: MA11

Credits: 3:1:0

Pre – requisites: Calculus & Vector Algebra

Contact Hours: 42L + 14T

Course Coordinator: Dr. S.H.C.V. Subba Bhatta & Dr. G Neeraja

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### Course Objectives:

#### The students will

1. Learn polar coordinate system and its applications to engineering problems.
2. Understand the concept of partial derivatives, composite functions and Jacobians.
3. Learn reduction formula to evaluate integrals and techniques to trace a given curve.
4. Learn the procedure of evaluating multiple integrals.
5. Study the concept of vector calculus and its applications.

### Unit-I

**Differential Calculus - I:** Polar curves, Angle between the radius vector and the tangent, Angle between the curves, Length of perpendicular from pole to the tangent, Pedal equations.

Partial Differentiation: Partial derivatives, Euler's theorem, Total differential coefficient, Differentiation of composite and implicit functions, Jacobians and properties.

### Unit-II

**Integral Calculus - I:** Reduction formulae for  $\sin^n x$ ,  $\cos^n x$ ,  $\sin^m x \cos^n x$ , Evaluation of these integrals with standard limits, Tracing of curves (both Cartesian and polar).

Application of integration – length of arc of a curve, plane areas, volumes and surface area of revolution.

### Unit-III

**Vector differentiation:** Vector functions of a single variable, Derivative of a vector function, Geometrical interpretation, Velocity and acceleration.

Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence of a vector field, Solenoidal vector, Curl of a vector field, Irrotational vector, Laplacian operator, Vector identities (Standard vector identities).

### Unit-IV

**Integral Calculus - II:** Multiple integrals- evaluation of double and triple integrals, Change of order of integration, Change of variables. Applications of double and triple integrals to find areas and volumes.



## Unit-V

**Vector Integration:** Line integrals, surface integrals and volume integrals. Green's theorem (with proof) and its applications, Stokes' theorem (without proof) and its applications, Gauss divergence theorem (without proof) and its applications.

### Text Books:

1. **G.B. Thomas and R.L. Finney** – Calculus and Analytical Geometry, Pearson, 12<sup>th</sup> Edition, 2017.
2. **B.S. Grewal** – Higher Engineering Mathematics, Khanna Publishers, 44<sup>th</sup> Edition, 2017.

### Reference Books:

1. **Erwin Kreyszig** – Advanced Engineering Mathematics, Wiley publication, 10<sup>th</sup> Edition, 2015.
2. **Peter V. O'Neil** – Advanced Engineering Mathematics, ThomsonBrooks/Cole, 7<sup>th</sup> Edition, 2011.
3. **Glyn James** – Advanced Modern Engineering Mathematics, Pearson Education, 4<sup>th</sup> Edition, 2010.
4. **George B. Thomas, Maurice D. Weir, Joel R. Hass** - Thomas' Calculus, Pearson, 13<sup>th</sup> Edition, 2014.

### Course Outcomes (COs):

At the end of the course the student will be able to

1. Solve problems related to polar curves, composite functions and Jacobians. (PO-1, PO-2)
2. Trace a curve using its guiding properties and use integration to find its perimeter, surface area and volume. (PO-1, PO-2)
3. Apply vector differentiation to identify solenoidal and irrotational vectors. (PO-1, PO-2)
4. Evaluate multiple integrals and use them to find areas and volumes. (PO-1, PO-2)
5. Exhibit the interdependence of line, surface and volume integrals using integral theorems. (PO-1, PO-2)

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## ENGINEERING PHYSICS

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Course Code: PY12 / 22

Credits: 3:1:0

Pre – requisites: Nil

Contact Hours: 42L + 14T

Course Coordinator: Dr. Seema Agarwal

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### Course Objectives:

- To familiarize students with the concepts of Elasticity, Theory of vibrations and time varying electromagnetic systems and the ideas of electromagnetic waves.
- To expose students to the ideas of wave particle dualism, quantum mechanics and basic principles of lasers and optical fibres.

### Course Contents:

#### Unit-I

##### Elasticity and Vibrations:

**Elasticity**—Introduction --Hooke's law — Poisson's ratio— Derivations for  $Y$ ,  $K$ ,  $n$  in terms of linear and lateral strains-- Relationship between  $Y$ ,  $k$ ,  $n$  and  $\sigma$ — Torsion of a cylinder and determination of couple per unit twist—Torsion pendulum—Determination of rigidity modulus using torsion pendulum --Bending moment of a beam (qualitative) – Cantilever loaded at free end.

**Vibrations** -- Introduction to vibrations—Analysis of Free and damped vibrations – under, over and critical damping—logarithmic decrement and quality factor—Forced vibrations and Resonance —LCR circuits and electrical resonance.

#### Unit-II

##### Concepts of Modern Physics and Quantum Mechanics:

**Particle nature of electromagnetic radiation**—Discussion of Blackbody spectrum— Wien's law, Rayleigh Jeans law , Stefan -Boltzman law and Planck's law (qualitative)— Deduction of Wien's law and Rayleigh Jeans law from Planck's law –Compton effect .

**Wave nature of particles**—de-Broglie waves—Phase and group velocities— Expression for group velocity from superposition principle—Equivalence of group velocity to velocity of particle--Relationships between phase velocity and group velocity in dispersive and non dispersive media—Heisenberg's uncertainty relationships-- Applications (Non confinement of electrons in atomic nucleus)-- characteristics of a well behaved wave function—Born approximation and normalization of the wave function—Setting up of one dimensional time independent Schrodinger's wave equation from classical wave equation—Eigen values and energy of a particle in an infinite one dimensional potential well.

## Unit-III

### Electrical conduction in solids:

**Metals**— Classical free electron theory of metals—Drawbacks of classical free electron theory--Quantum free electron theory— Density of energy states in a metal --- Fermi energy at 0 K—Effect of temperature on Fermi-Dirac Distribution function - Effect of temperature on  $f(E)$ ,  $n(E)$  vs  $E$  and  $g(E)$  vs  $E$  graphs. Merits of quantum free electron theory.

**Semiconductors:** Formation of energy bands in solids (qualitative)—Density of energy states in conduction and valence bands of a semiconductor—Thermal equilibrium concentration of electrons in conduction band—Intrinsic carrier concentration—Hall effect.

## Unit-IV

### Electromagnetic theory (Maxwell's equations):

Fundamentals of vector calculus: Divergence and Curl of Electric field and Magnetic field, Gauss divergence theorem, surface and volume integrals, Stokes' theorem, Gauss flux theorem in electrostatics and magnetism, Ampere's law, Biot-Savart's law and Faraday's law in vector notation, Continuity equation, Displacement current(I), Maxwell-Ampere's law, Maxwell's equations, Plane Electromagnetic waves in vacuum, Transverse nature of electromagnetic waves, Polarization of EM waves.

## Unit-V

### Lasers and Optical fibers:

**Lasers**--Interaction of radiation with matter—Induced Absorption—spontaneous emission and stimulated emission--Expression for energy density of radiation in terms of Einstein coefficients at thermal equilibrium—Requisites of a laser system-- Three and four level lasers--Principle and operation of He-Ne and semiconductor Lasers

**Optical Fibers**--Propagation mechanisms in optical fibers, Angle of acceptance and Numerical aperture –Types of optical fibers—Step index and graded index fibers-- Intermodal dispersion—Attenuation in optical fibers.

### Text Books:

1. **Gaur and Gupta** - A Textbook of Engineering Physics, Dhanpat Rai Publishers, New Delhi, 8<sup>th</sup> revised Edition, 2015.
2. **Kenneth S.Krane**- Modern Physics, Wiley-India- 3<sup>rd</sup> Edition, 2019.
3. **David J. Griffiths** – Introduction to Electrodynamics, Prentice – Hall, 5<sup>th</sup> Edition.

## Reference Books:

1. **B.B. Laud** - Lasers and non-linear optics, New Age International, 3<sup>rd</sup> Edition, 2015.
2. **Donald A Neamen** - Semiconductor Physics and Devices, Tata McGraw Hill, 4<sup>th</sup> Edition, 2012.
3. **D.S. Mathur** – Elements of properties of matter, S.Chand and company, 11<sup>th</sup> Edition, 2013.
4. **The Feynman Lectures on Physics** – Addison-Wesley

## Course Outcomes (COs):

At the end of the course the student will be able to

1. Enumerate the construction and working of simple laser systems, understand the propagation mechanism of EM waves in optical fibers. (PO-1)
2. Analyze elastic moduli in different cases and enumerate free, damped and forced vibrations. (PO-1)
3. Distinguish between phase and group velocities; solve Schrödinger's time independent wave equation for the case of infinite potential well. (PO-1)
4. Apply the quantum theory to understand the electrical conductivity of metals and calculate carrier concentration in metals and semiconductors. (PO-1)
5. Explain fundamental laws governing electromagnetic fields and justify the concepts of electromagnetic waves. (PO-1)

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## ELEMENTS OF MECHANICAL ENGINEERING

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Course Code: ME13/23

Credits: 3:0:0

Pre – requisites: Nil

Contact Hours: 42L

Course Coordinator: Dr. Anil Kumar T

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### Course Contents:

#### Unit-I

**Steam boilers:** Formation of steam at constant pressure, Conditions of steam, Properties of steam with simple numerical problems. Boilers, Boiler mountings, Accessories and applications;

**Steam turbine:** Prime movers, Impulse and Reaction turbine, Definitions of compounding, methods of compounding,

**Gas turbine:** Classification, Working principles and operations, Open and closed cycle gas turbines;

**Water turbine:** Classification, Working principle of Pelton, Francis and Kaplan turbines, Demonstration of boilers and prime movers.

#### Unit-II

**Internal combustion engines:** Classification, Parts of an I.C. engine, 2 stroke, 4 stroke, petrol and diesel engines, Simple numerical problems on indicated power, Indicated thermal efficiency, Brake power, Brake thermal efficiency, Mechanical efficiency, Specific fuel consumption, Demonstration of I.C. engine. Refrigeration and air conditioning: Classification of refrigeration, working principles of vapor compression and vapor absorption refrigerator, Properties of refrigerant, Working principle of window air conditioner.

#### Unit-III

**Metal removal processes:** Machine tools, specifications of lathe, parts of engine lathe, Working principle, Lathe operations; Plain turning, Facing, Parting, Grooving, Knurling, Taper turning and Thread cutting. Drilling machine: Working principles of bench and radial drilling machines, Drilling operations; Drilling, Reaming, Boring, Counter sinking, Counter boring, Spot facing. Milling machines: Methods of cutting, Milling machines; Horizontal and Vertical Milling operations; Plain, Angular, Slot, Form, Straddle, Gang, Face and End milling. Demonstration of the above machine tools.

#### Unit-IV

**Computer numerical control machines:** Numerical Control, Computer Numerical Control and Direct Numerical Control.

**Metal Joining Processes:** Welding, Soldering and brazing, Oxyacetylene welding, Arc welding, Electrodes, Soldering and Brazing. Demonstration of welding and soldering.  
**Introduction to Composites:** Role of matrix and reinforcements, MMCs, PMCs and CMCs, Advantages, limitations and applications.

### **Unit-V**

**Power transmission:** Belt drives; Types, Velocity ratio, Slip, Length of belts for open belt and cross belt drive, Angle of lap, ratio of belt tensions, Power transmitted, Creep in belt drive. Pulleys; Stepped, Tight and loose, Idler, Simple numerical problems. V-belt drive, Gear drives: Classification of gears, Spur gear nomenclature, Velocity ratio, Pinion and rake, Helical gears, Bevel gears and Worm gears. Gear train: Train values, Classification of gear trains and their uses, Simple numerical problems on Simple, Compound and Reverted gear trains.

### **Text Books:**

1. **K.R.Gopalakrishna, Sudhir Gopalakrishna, S.C.Sharma** – Elements of Mechanical Engineering, Sudha Publications, 2015.
2. **V. K. Manglik** – Elements of Mechanical Engineering, PHI Learning Pvt. Ltd., 2013.
3. **R.K. Rajput** - Elements of Mechanical Engineering, Firewall Media, 2005.

### **Reference Books:**

1. **R.K. Rajput** – Thermal Engineering, Laxmi Publication Pvt Ltd, 3<sup>rd</sup> Edition, 2007.
2. **R.S. Khurmi and I.K Gupta**- Theory of Machines, S. Chand and Company Ltd, New Delhi, 1<sup>st</sup> Edition, 2007.
3. **Serope Kalpakjain and Steven R. Schmid** -Manufacturing Processes for Engineering Materials, Pearson Education, 4<sup>th</sup> Edition, 2007.
4. **Pravin Kumar** - Basic Mechanical Engineering, Pearson publication, 1<sup>st</sup> Edition, 2013.
5. **F.L.Matthews, R.D. Rawlings** – Composite Materials: Engineering and Science, Woodhead Publishing, 1999.

## **Course Outcomes (COs):**

At the end of the course, students will be able to :

1. Recognize various conditions of steam, its formation using boilers, prime movers for various power plants and other applications.(PO-1, PO-2, PO-7)
2. Illustrate the construction and working of I.C. engines, refrigeration and air conditioning systems required for transportation, domestic and industrial purpose.(PO-1, PO-2, PO-7)
3. Identify various machining process, joining and other manufacturing techniques used for the production of various components.(PO-1, PO-2)
4. Differentiate the power transmission systems used in various applications. (PO-1, PO-2)
5. Identify the significance of mechanical engineering concepts in various fields of engineering applications.(PO-1, PO-2, PO-4, PO-12)

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## BASICS OF CIVIL ENGINEERING AND MECHANICS

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Course Code: CV14/24

Credits: 3:0:0

Pre – requisites: Nil

Contact Hours: 42L

Course Coordinator: B. Suguna Rao

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### Course Contents:

#### Unit-I

##### **Introduction to Civil Engineering-**

Scope of major fields of civil engineering-Surveying, Geotechnical Engineering, Structural Engineering, Hydraulics & Water Resources, 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.

Roads: Types of Roads and their functions, Dams: Different types of Dams based on Material, Structural behaviour and functionality with simple sketches.

Materials of Construction: Properties & applications of PCC, RCC, PSC and steel.

#### Unit-II

**Introduction to Engineering Mechanics:** Basic idealizations - Particle, Continuum and Rigid body, Introduction to SI units. Force- Definition, classification of force systems, composition and resolution of forces. Numerical Problems on composition and resolution of forces. Principle of Transmissibility of forces. Resultant of coplanar concurrent force system. Numerical problem on Resultant of coplanar concurrent force systems. Couple, Moment of a couple, Characteristics of couple, Moment of a force, Equivalent force - Couple system; Numerical problems on moment of forces and couples, on equivalent force - Couple system. Varignon's theorem, Resultant of non-concurrent force systems. Numerical problems on Resultant of non-concurrent force systems.

#### Unit-III

**Equilibrium of concurrent force system:** Equilibrium of coplanar concurrent system of forces, free body diagram, Conditions of equilibrium. Definition of Equilibrant, Numerical problems on equilibrium of coplanar concurrent force systems.

**Equilibrium of non-concurrent force system** Equilibrium of non-concurrent system of forces, Types of loads, supports for beam, statically determinate and indeterminate beams, Numerical problems on statically determinate beams subjected to concentrated load, Uniformly distributed load, Uniformly Varying Load and their combinations Problems on equilibrium of different force systems.



## Unit-IV

**Centroid:** Definition of Centroid & Centre of Gravity, Axes of Symmetry, Location of Centroid of Rectangle, Triangle, Semicircle, Quadrant and sector of a circle by method of integration. Numerical problems on Centroid of Composite sections.

**Moment Of Inertia:** Concept of Moment of inertia, perpendicular axis theorem, parallel axis theorem, and moment of inertia of Rectangular, Circular, Semicircular, Quadrant of a circle Triangular sections by method of integration. Numerical Problems on moment of inertia of composite section.

## Unit-V

**Friction:** Definition of Friction and its applications, angle of friction, angle of repose, coefficient of friction. Types of Friction, laws of static friction, Description and application of friction on blocks on horizontal and inclined planes.

## Kinematics

Definitions – Displacement, Velocity, Speed, Acceleration, Newton's Laws of Motion, Types of motion equations of motion, Rectilinear Motion, Projectile Motion .Numerical problem on Equation of motion, rectilinear motion, Projectile motion.

## Text Books:

1. **H. J. Sawant & S.P. Nitsure** - Elements of Civil Engineering & Mechanics, Technical Publications, Pune, 2<sup>nd</sup> Edition, 2016.
2. **M. N Shesha Prakash, Ganesh B. Mogaveer** - Elements of Civil Engineering and Engg. Mechanics, PHI Learning Private Ltd, New Delhi, 3<sup>rd</sup> Edition, 2014.
3. **A Nelson** - Engineering Mechanics-Statics and Dynamics, Tata Mc Graw Hill Education Private Ltd, New Delhi, 2009.

## Reference Books:

1. **Stephen Timoshenko & D H Young, J. V. Rao** - Engineering Mechanics, McGraw Hill Education, 5<sup>th</sup> Edition, 2017.
2. **B. K Kolhapure** - Elements of Civil Engineering and Engineering Mechanics, Eastern book promoters, Belgaum, 2015.
3. **Beer FP and Johnson ER** - Mechanics for Engineers- Dynamics and Statics, Tata Mc Graw Hill. 3<sup>rd</sup> SI metric Edition, 2008.

## **Course Outcomes (COs):**

At the end of the course, students will be able to :

1. Describe various fields of Civil Engineering and summarize the construction materials. (PO-1, PO-10)
2. Analyze coplanar force systems. (PO-1, PO-2, PO-3)
3. Determine the equilibrium of coplanar force systems and statically determinate beams. (PO-1, PO-2, PO-3)
4. Locate the centroid and compute the moment of inertia of plane figures. (PO-1, PO-2, PO-3)
5. Apply friction laws to analyze the problems on friction and apply the relationship between motions of bodies. (PO-1, PO-2, PO-3)

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## BASIC ELECTRONICS

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**Course Code:** EC15/25

**Credits:** 3:0:0

**Pre – requisites:** Semiconductor Physics

**Contact Hours:** 42L

**Course Coordinator:** Veena G N

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### Course Contents:

#### Unit-I

**Semiconductor Diodes and Applications:** P-N junction diode, DC equivalent circuits, Half-wave rectifier, Two diode full wave rectifier, Bridge rectifier, Capacitor filter circuit, Zener diode voltage regulators (with no load and with load), 78xx based fixed IC voltage regulator

**Bipolar Junction Transistors:** BJT Operation, Common Emitter characteristics (Numerical examples as applicable)

#### Unit-II

**BJT Biasing:** DC load line and bias point, Voltage divider bias (Numerical examples as applicable)

**AC Analysis of BJT Circuits:** Common Emitter circuit analysis (Qualitative analysis only)

**Signal Generators:** Conditions for oscillations, BJT phase shift oscillator, BJT Colpitt's and Hartley oscillators (Qualitative analysis only)

#### Unit-III

**Field Effect Transistors:** Junction Field Effect Transistors (JFET), JFET characteristics and parameters, Metal Oxide Semiconductor Field Effect Transistors (MOSFETs): Depletion and Enhancement MOSFET, Complementary Metal Oxide Semiconductor (CMOS)

**Op-Amps:** Ideal Opamp, Basic Opamp circuits: Inverting amplifier, Non-inverting amplifier, Voltage follower, Summer, Subtractor, Integrator, Differentiator (Numerical examples as applicable)

#### Unit-IV

**Digital Electronics:** Number System, Decimal, Binary and Hexadecimal number systems, Converting decimal to binary/hexadecimal, Converting binary to decimal/hexadecimal, Converting Hexadecimal to binary/decimal, Complement of binary numbers

**Boolean Algebra:** Theorems, De Morgan's theorem, Digital circuits: Logic gates, NOT, AND, OR, XOR, NAND, NOR and XNOR gates, Algebraic simplification, NAND and NOR implementation, Half adder, Full adder

**Flip Flops:** Introduction to flip flops, NAND gate latch/NOR gate latch, RS flip flop

### **Unit-V**

**Transducers:** Introduction, Passive electrical transducers, Resistive transducers, Resistance thermometers, Thermistor, Active electrical transducers, Piezo-electric transducer, Photoelectric transducer

**Applications:** Block diagram of analog and digital communication systems, Block diagram of a digital TV system, Block diagram of satellite communication, Principle of operation of a mobile phone

### **Text Books:**

1. **David. A. Bell** - Electronic Devices and Circuits, Oxford University Press, 5<sup>th</sup> Edition, 2008.
2. **D. P. Kothari, I. J. Nagrath** - Basic Electronics, McGraw Hill Education (India) Private Limited, 2<sup>nd</sup> Edition, 2014.

### **Reference Books:**

1. **Robert L Boylestad and Louis Nashelsky** - Electronic Devices and Circuit Theory, Pearson Publications, 11<sup>th</sup> Edition, 2013.
2. **Thomas L. Floyd** - Electronic Devices, Pearson Education, 9<sup>th</sup> Edition, 2012.

### **Course Outcomes (COs):**

1. Describe semiconductor devices and its applications (PO-1, PO-2)
2. Analyze the various circuits of BJT. (PO -1, PO-2)
3. Employ Op-Amp in various circuits. (PO-1, PO-2)
4. Analyze digital circuits. (PO-1, PO-2)
5. Appreciate the importance of transducers and communication system. (PO-1)

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## ENVIRONMENTAL STUDIES

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**Course Code: HS16/26**

**Credits: 0:0:0**

**Pre – requisites: Nil**

**Contact Hours: 28L**

**Course Coordinator: Swathi T S**

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### Course Contents:

#### Unit-I

##### **Environment, Ecology and Biodiversity**

Definition, scope and importance of Environmental Studies. Multidisciplinary nature of Environmental Studies. The concept of an ecosystem, biotic and abiotic components of an ecosystem and their interaction. Food chain and food web. Energy flow and material cycling in ecosystem and balanced eco system. Biodiversity, ecological values of biodiversity and threats to biodiversity. Concept of sustainable development, objectives and applications of sustainable development.

#### Unit-II

##### **Natural resources**

Forest resources-ecological importance of forests, deforestation, causes of deforestation and remedial measures. Water resources & global water resources distribution. Mineral resources and environmental impacts of mining. Food resources- effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity. Land resources-landslides, soil erosion and desertification.

#### Unit-III

##### **Energy sources**

Growing energy needs. Renewable and non-renewable energy sources. Environmental impacts of fossil fuel use. Alternative to fossil fuels: different clean renewable energy resources with their merits and demerits. Bio energy, ethanol and bio mass energy. Energy of the future: Hydrogen fuel cells and nuclear energy. Environmental Impact Assessment (EIA): Definition, objectives and benefits. Step by step procedure of conducting EIA.

#### Unit-IV

##### **Environmental pollution**

Definition, causes, effects and control measures of water pollution, air pollution and soil/ land pollution. Management of municipal solid waste & treatment methods for municipal solid waste. Dams: benefits and problems. Effects of housing and infrastructure development on environment.

## Unit-V

### Environmental protection

Global warming and climate change, acid rain & ozone layer depletion. Salient features of Environmental Protection Act, Air Act & Water Act. Functions of Central and State Pollution Control Boards. Environmental Management & ISO 14000.

### Text Books:

1. **Dr. Prakash S. M** - Environmental Studies, Elite Publishers, 2007.
2. **Meenakshi** - Environmental science and engineering, Prentice Hall of India, 2<sup>nd</sup> Edition, 2012.
3. **Benny Joseph** - Environmental Studies, Tata Mc-GrawHill, 2<sup>nd</sup> Edition, 2009.
4. **Rajagopalan R** - Environmental Studies – From Crisis to Cure, Oxford University Press, 2005.

### Reference Books:

1. **Venugopala Rao P** - Principles of Environmental Science & Engineering, Prentice Hall of India, 1<sup>st</sup> Edition, 2006.
2. **Suresh K. Dhameja** - Environmental Engineering and Management, S. K. Kataria & Sons, 2010.
3. **Raman Sivakumar** - Principals of Environmental Science and Engineering, Cengage learning, Singapore, 2<sup>nd</sup> Edition, 2005.
4. **Tyler Miller Jr. G** - Environmental Science – Working with the Earth, Thomson Brooks Cole, 11<sup>th</sup> Edition, 2006.

### Course Outcomes (COs):

At the end of the course, students will be able to :

1. Describe the importance of environmental studies, sustainable development and biodiversity. (PO-1, PO-7)
2. Discuss the importance of natural resources, environmental impacts on these resources and suggest remedial measures. (PO-1, PO-7)
3. Distinguish different types of energy sources and identify alternative energy for sustainable development. (PO-1, PO-7)
4. Identify the causes, effects and control measures of environmental pollution. (PO-1, PO-7)
5. Outline the current environmental issues and the role of agencies for environmental protection. (PO-1, PO-7)

## KANNADA MANASU

Course Code: HS17/27M

Credits: 2:0:0

Pre – requisites: Nil

Contact Hours: 28L

Course Coordinator: Sukanya N

### Course Contents:

#### ಘಟಕ-1

##### ಲೇಖನಗಳು (Article)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ: ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ

##### ಕಾವ್ಯಭಾಗ (Poetry)

3. ವಚನ

#### ಘಟಕ-2

4. ಕೀರ್ತನೆ
5. ತತ್ವಪದ
6. ಜನಪದ

#### ಘಟಕ-3

7. ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ
8. ಕುರುಡು ಕಾಂಚಾಣ
9. ಚೋಮನ ಹಾಡು

#### ಘಟಕ-4

10. ಡಾ|| ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ - ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ. ಎನ್. ಮೂರ್ತಿರಾಯರು ಕಥೆ (Story), ಪ್ರವಾಸಕಥನ (Travelogue).
11. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
12. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ.

#### ಘಟಕ-5

##### ತಾಂತ್ರಿಕ ವಿಜ್ಞಾನ (Technical Science)

13. ಕರ ಕುಶಲಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ ಕರೀಗೌಡ ಬೀಚನ ಹಳ್ಳಿ ಕಂಪ್ಯೂಟರ್ ಹಾಗೂ ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ
14. 'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳು ಮತ್ತು ಕಂಪ್ಯೂಟರ್ ಮುಖಾಂತರ ಕನ್ನಡ ಟೈಪಿಂಗ್
15. ತಾಂತ್ರಿಕ ಪದಕೋಶ: ತಾಂತ್ರಿಕ ಹಾಗೂ ಪಾರಿಭಾಷಿಕ ಕನ್ನಡ ಪದಗಳು.

### ಪಠ್ಯ ಪುಸ್ತಕ (Text Book):

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ Edited by: Dr. H. C. Boralingaiah, Dr. L.Thimeesha, Prof. V. Keshavamurty Prasaranga, V T U, Belagavi, Karnakataka.

### ಪೂರಕ ಪಠ್ಯ (Reference Book):

1. ಕನ್ನಡ ಮನಸು Kannada Prasaranga

### ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು Course Outcomes (COs):

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡದ ಜೊತೆಗೆ ಕ್ರಿಯಾತ್ಮಕ, ಸಾಹಿತ್ಯ, ಸಾಂಸ್ಕೃತಿಕ ಮತ್ತು ನಾಡು ನುಡಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು. (PO-6)
2. ಕನ್ನಡ ಭಾಷೆಯ ವ್ಯಾಕರಣ, ಭಾಷಾ ರಚನೆಯ ನಿಯಮಗಳನ್ನು ಪರಿಚಯಿಸುವುದು. (PO-10)
3. ಕನ್ನಡ ಭಾಷಾ ಬರೆಯುವಲ್ಲಿ ಕಂಡು ಬರುವ ದೋಷಗಳು, ಅವುಗಳ ನಿವಾರಣೆ. (PO-12)
4. ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು, ಸರ್ಕಾರಿ ಹಾಗೂ ಅರೆ ಸರ್ಕಾರಿ ಪತ್ರ ವ್ಯವಹಾರದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವುದು. (PO-6)
5. ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧ ರಚನೆ ಬಗ್ಗೆ ಆಸಕ್ತಿ ಮೂಡಿಸುವುದು. (PO-10)
6. ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು. (PO-6)



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## KANNADA KALI

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Course Code: HS17/27K

Credits: 2:0:0

Pre – requisites: Nil

Contact Hours: 28L

Course Coordinator: Dr. Premila Swamy & Kanya Kumari.S

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### Course Contents:

#### Unit-I

**Chapter 1:** Parichaya. Introduction to Kannada Language, Karnataka State and Literature Kannada Bhashe - About Kannada Language, Eight Kannada Authors - JnanpiTh Awardies

#### Unit: II

**Chapter 2:** Kannada PadagaLu mattu Vaakyagalu Kannada Words and Sentences naamapadagaLu – Sarva namapadagaLu – (Nouns -Pronouns) and it's usage in Kannada

**Chapter 3:** Kannada namavisheshanagaLu - (Adjectives-Interrogatives)

**Chapter 4:** Sambhashaneyalli Prashnarthaka padagalu mattu vaakyagaLu (Kannada-Interrogative words and Sentences in Conversation)

**Chapter 5:** KriyapadagaLu, kriyavisheshanagalu-(verb-adverb) Kannada Samyogagalu (Prepositions) - Upasarga (Conjunctions) (Kannada -verb - Adverbs - Prepositions in Conversation)

#### Unit: III

**Chapter 6:** Kannada Bhasheyalli Sambhashanegalu- Conversations in Kannada sambhashaNe: (Conversation With Friends- Teachers, between Friends) (Conversation in Shop, Hostel, Market, Bus and Train) Shabdakosha: Vocabulary – chaTuvaTike: Exercises

**Chapter 7:** Vicharaneya / Bedikeya vaakyagalu (Enquiry /Request sentences in Conversation)

**Chapter 8:** Sambhashane Conversation with House Owner and Room mate Shabdakosha – Vocabulary - Exercises to test their knowledge of understanding the Language

#### Unit: IV

**Chapter 9:** Saamanya Sambhashaneyalli Kannadada Padagalu mattu Vaakyagalu. (Kannada Words and Sentences in General Conversation with activities) – Sambhashaneyalli Eakavachana mattu Bhahuvachana- (Singular and Plural nouns) Conversation- Sambhashaneyalli Linga rupagaLu- Genders in Conversation

**Chapter 10:** Viruddha padagalu /Virodarthaka padagalu (Antonyms) Asamanjasa Uchcharane (Inappropriate Pronunciation)

**Chapter 11:** Sankhya Vyavasthe (Numbers system) -Samaya /Kalakke Sambhandhisida padhagalu (Words Relating to time) – Dikkugalige sambhadhisida padhagalu (Words Relating to Directions)

**Chapter 12:** Aaharakke sambandisida padagaLu (Names connected with food)

**Chapter 13:** Manavana shareerada bhagagalu / Angagalu (Parts of the Human body  
Maanava Sambhandhada da padhagalu (Terms Relating to Human Relationship)

**Chapter 14:** Maanavana Bhavanegalige sambandisida Padagalu (Words Relating to  
Human's feelings and Emotions) Vaasada staLakke sambhandisidanthaha padhagalu  
(Words Relating to place of leaving)

### **Unit: V**

**Chapter 15:** Kannada akshara maale- swara akshara – vyanjanaksharagaLu (Kannada  
alphabets and their practices with pronunciations) Tantragnana mattu AaDalita  
padagaLu-Technical and administrative worlds in Kannada

### **Text Book :**

1. **Dr. L.Thimmesh., Prof. Keshava muurthy**, - 'BaLake kannada' prasarangaa,  
Vishveshvaraiiah Tantrika vishvavidyalaya.

### **Reference Book:**

1. **Lingadevaru Halemane** - Kannada Kali, Prasaranga kannada University,  
Hampi 3rd Edition. 2015

### **Course Outcomes (COs):**

As the end of the course students will be able to :

1. Develop vocabulary. (PO-10, PO-12)
2. Identify the basic Kannada language skill. (PO-10, PO-12)
3. Develop listening & speaking skill in Kannada language. (PO-10, PO-12)
4. Enrich language skill. (PO-6, PO-10, PO-12)
5. Apply Kannada language skill for various purpose. PO-6, PO-10, PO-12)

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## ENGINEERING PHYSICS LABORATORY

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**Course Code:** PYL18/28

**Credits:** 0:0:1

**Pre – requisites:** Nil

**Contact Hours:** 14P

**Course Coordinator:** Dr. Vaijyanthimala

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### **Course Objectives:**

The objective of this course is to impart necessary and practical knowledge of concepts of Physics through experiments and develop basic skills and confidence in handling instruments.

### **Course Contents:**

#### **Engineering Physics Lab Experiments**

1. General Instructions and Introduction to Error Analysis.
2. Plotting of forward and reverse bias characteristics of a Zener Diode and determination of breakdown voltage.
3. Determination of input, output and mutual characteristics of a transistor and calculation of  $\alpha$  and  $\beta$  values.
4. Measurement of capacitance and dielectric constant of a capacitor by charging and discharging it through a resistor.
5. Calculation of Planck's constant using LEDs.
6. Verification of Stefan's law
7. Identification of different components (L,C or R) of a Black Box and calculation of their values through frequency response curves.
8. Determination of Moment of inertia of an irregular body and calculation of rigidity modulus of the material of the suspension wire using torsional oscillations.
9. Measurement of Young's Modulus of the material of the single cantilever beam.
10. Determination of Energy gap of semiconductor.
11. Determination of numerical aperture (NA) and attenuation coefficient of optical fiber.
12. Determination of Fermi energy of a metal.
13. Measurement of operating wavelength of semiconductor laser using Laser diffraction.
14. Measurement of radius of curvature of a lens by Newton's rings method.
15. Calculation of thickness of given paper strip by the method of interference fringes.(Air wedge)
16. Frequency response of series and parallel LCR circuits and calculation of Q-factor and band width.

17. Determination of Hall coefficient and concentration of charge carriers of the semiconductor.
  18. Simulation of electrical experiments using Pspice
- Students are required to perform 12 prescribed experiments (from 2 to 18) in the above list. Cyclic order will be followed.
  - Experiment 18 is compulsory for all students.

### **Reference Books:**

1. Laboratory manual prepared by the Physics department, RIT, Bangalore.

### **Course Outcomes (COs)**

At the end of course, students will be able to,

1. Determine elastic constants of material using torsion pendulum and cantilever. (PO-1, PO-4)
2. Apply the concepts of interference and diffraction of light to determine thickness of thin films and wavelength of light. (PO-1, PO-4)
3. Construct and analyze simple AC and DC circuits to determine electrical parameters, familiarity with the concepts of modern Physics. (PO-1, PO-4, PO-5)

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## WORKSHOP PRACTICE

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**Course Code: MEL19/29**

**Credits: 0:1:1**

**Pre – requisites: Nil**

**Contact Hours: 14L + 14T**

**Course Coordinator: Dr. Aruna Kumara P C**

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### Course Contents:

1. Fitting Shop: Fitting of any three common joints. (3 classes)
2. Welding Shop: Welding of any three common joints. (3 classes including sl. No.4)
3. Sheet Metal Work Sheet-metal models – Rectangular Prism closed at one end, Rectangular 90° tray & Funnel.
4. Machine Shop: Two lathe models involving step turning, taper turning and knurling operations. (2 classes)
5. Demonstration of Radial drilling machine operations and typical milling operations.
6. Practice of drilling using lathe and drilling machine.
7. Practice of use of Power Tools for common machining operations. (2 classes including 5 & 6)

### Text Book:

1. Workshop manual-Department of Mechanical Engineering.RIT, Bangalore, 2<sup>nd</sup> Edition, 2014.

### Reference Books:

1. **S. K. H. Choudhury, A. K. H. Choudhury, Nirjhar Roy** - The Elements of Workshop Technology, Volume I & II, Media promoters and publishers, Mumbai, 11<sup>th</sup> Edition, 2001.
2. **James Anderson, Earle E Jatro** - Shop Theory, Tata McGraw hill publications, 2<sup>nd</sup> Edition, 2005.

### Course Outcomes (COs):

At the end of the course, students will be able to :

1. Remember the role of basic workshop practices in the functioning of various daily life appliances.(PO-1, PO-2, PO-3, PO-5, PO-12)
2. Understand the significant details of workshop tools, machines and simple fabrication processes.(PO-1, PO-2, PO-3, PO-12)
3. Apply the knowledge of workshop practice methods to demonstrate utilitarian skills. (PO-1, PO-3, PO-5, PO-12).

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## ENGINEERING MATHEMATICS - II

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**Course Code:** MA21

**Credits:** 3:1:0

**Pre – requisites:** Calculus & Differential equations      **Contact Hours:** 42L + 14T

**Course Coordinator:** Dr. S.H.C.V. Subba Bhatta & Dr. G Neeraja

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### Course Objectives:

#### The students will

1. Learn to determine radius of curvature, Taylor’s series expansion and extreme values of functions of two and three independent variables.
2. Learn to solve linear differential equations with constant and variable coefficients.
3. Learn to solve partial differential equations.
4. Learn to evaluate improper integrals using Beta and Gamma functions.
5. Learn to use Laplace transform method to solve initial and boundary value problems.

### Course Contents:

#### Unit-I

**Differential Calculus - II:** Derivatives of arc length, Curvature, Radius of curvature. Taylor’s series and Maclaurin’s series (without proof), Taylor’s and Maclaurin’s series for functions of two variables (without proof), Maxima and minima of functions of two variables, Lagrange’s method of undetermined multipliers.

#### Unit-II

**Applications of first order and first degree differential equations:** Applications of first order and first degree ODEs to solve LCR circuits, Newton’s law of cooling and orthogonal trajectories.

**Linear differential equations of higher Order-I:** Linear differential equations of higher order with constant coefficients.

#### Unit-III

**Linear differential equations of higher order-II:** Cauchy’s and Legendre’s linear differential equations, Method of variation of parameters – Engineering applications.

**Partial differential equations:** Introduction to PDE, Solutions of partial differential equations - direct integration method, Lagrange’s method and method of separation of variables.

## Unit-IV

**Beta and Gamma Function:** Definition, Relation between Beta and Gamma function.

**Laplace transforms I:** Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, integrals, multiplication by t, division by t, Evaluation of integrals by Laplace transforms, Unit-step function, Unit-impulse function.

## Unit-V

**Laplace transforms II:** Laplace transforms of periodic function, Inverse transforms, Convolution theorem, Solution of linear differential equations and simultaneous linear differential equations using Laplace transforms, Engineering applications.

### Text Books:

1. **G. B. Thomas and R.L. Finney** – Calculus and Analytical Geometry, Pearson, 12<sup>th</sup> Edition, 2017.
2. **B.S. Grewal** – Higher Engineering Mathematics, Khanna Publishers, 44<sup>th</sup> Edition, 2017.

### Reference Books:

1. **Erwin Kreyszig** – Advanced Engineering Mathematics, Wiley publication, 10<sup>th</sup> Edition, 2015.
2. **Peter V. O' Neil** – Advanced Engineering Mathematics, Thomson Brooks/Cole, 7<sup>th</sup> Edition, 2011.
3. **Glyn James** – Advanced Modern Engineering Mathematics, Pearson Education, 4<sup>th</sup> Edition, 2010.
4. **George B. Thomas, Maurice D. Weir, Joel R. Hass** - Thomas' Calculus, Pearson, 13<sup>th</sup> Edition, 2014.

### Course Outcomes (COs):

At the end of the course the student will be able to

1. Find the arc length, radius of curvature, extreme values, and power series expansion of a function. (PO-1, PO-2)
2. Solve first and higher order linear differential equations with constant coefficients. (PO-1, PO-2)
3. Solve higher order linear differential equations with variable coefficients and PDE's. (PO-1, PO-2)
4. Determine Laplace transform of standard functions. (PO-1, PO-2)
5. Use the concept of Laplace transforms to solve initial and boundary value problems. (PO-1, PO-2)

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## ENGINEERING CHEMISTRY

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Course Code: CY12/22

Credits: 3:0:0

Pre – requisites: Nil

Contact Hours: 42L

Course Coordinator: Dr. B. M. Nagabhushana & Dr. Nagaraju Kottam

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### Course Objectives:

#### The objective of this course is students to:

1. Study the chemistry of portable energy storage devices like various conventional as well as modern batteries and their usage in different aspects of life.
2. Gain the knowledge of corrosion science and anti-corrosive techniques to monitor & protect corrosion.
3. Study of conventional and renewable energy resources and quality of chemical fuels. Gain the knowledge of nanomaterials.
4. Explore the economically viable technologies developed for proper utilization and purification of water resources.
5. To provide basic skills in chemical and biological analysis of water and materials.
6. Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process. Gain the knowledge of liquid crystals and their applications.

### Course Contents:

#### Unit-I

**Electrode potential and chemical cells (EP):** Basic concepts of electrochemistry – electrode potential, origin of single electrode potential. Galvanic cells. Derivation of Nernst equation. Reference electrodes – calomel electrode, Measurement of single electrode potential using saturated calomel electrode. Ion-selective electrode - Glass electrode (No construction & working). Determination of pH of a solution using glass electrode. Concentration cells. Numerical problems on electrode potential, EMF of cells and concentration cells.

**Batteries (BT):** Basic concepts. Mechanism of battery operation, battery characteristics. Classification of batteries – Primary, secondary and reserve batteries. Modern batteries-construction, working and applications of Nickel-Metal hydride battery, Li-ion (Lithium batteries). New generation Batteries: Introduction and Example-Al-air batteries and solar energy storage battery



## Unit-II

**Corrosion science (CS):** Metallic corrosion - Definition, electrochemical theory of corrosion. Types of corrosion - Differential metal corrosion, differential aeration corrosion (Ex: pitting and waterline corrosion) and Stress corrosion. Factors affecting the rate of corrosion. Corrosion control Methods: Chemical Methods: Inorganic coatings- anodizing and phosphating. Corrosion inhibitors. Physical Methods: Cathodic Protection-sacrificial anode method. Metal coating- Anodic and cathodic metal coatings with examples. Multifunctional coatings (Thermal resistance and Scratch resistance).

## Unit-III

**Energy Sources (ES):** Introduction, characteristics of good fuel. Calorific value– Definition, net and gross calorific values. Determination of calorific value of a solid fuel by bomb calorimeter. Numerical problems. Liquid fuels: Petroleum cracking - fluidized bed catalytic cracking, Reforming of petrol. Knocking – mechanism, octane number, cetane number, prevention of knocking. Bio-diesel: Introduction, synthesis, advantages and applications. Energy from natural resources: Solar energy- Different types of solar panels. Sixth generation P-V cells. Solar cars.

**Chemistry of nanomaterials (CNM):** Introduction to nanomaterials. Comparison between bulk and nano particles. Synthesis: top-down and bottom-up approaches. Chemical methods of synthesis- solution combustion and hydrothermal methods. Characterization techniques like PXRD, SEM, and TEM (only mention & introduction). Applications and disadvantages of nanomaterials.

## Unit-IV

**Water Technology (WT):** Water treatment: Physical and Chemical methods. Hardness – definition, types of hardness and its determination by EDTA method – numerical problems. Determination of dissolved (DO) oxygen by Winklers method. Biological Oxygen Demand (BOD)–definition, determination and numerical problems. Chemical Oxygen Demand (COD) – Definition, determination and numerical problems. Determination of amount of chloride present in water sample by Argentometric method. Determination of nitrate using phenol disulphonic acid (spectrophotometric method) and sulphate by gravimetric method. Potable water – Definition. Nano technology for water treatment: Removal of bacteria from water using nano silver particles. Membrane based Technology for water purification: Purification of water by reverse osmosis. Technology for water conservation.

## Unit-V

**Polymer Science (PS):** Introduction to high polymers. Glass transition temperature (T<sub>g</sub>), factors influencing T<sub>g</sub>. Conducting polymers - Definition, mechanism of conduction in polyacetylene. High performance (Engineering) polymers: Synthesis, properties and applications of Nylon – 6,6 Urea – formaldehyde, Teflon and PMMA. Testing of polymers: TGA-DSC.

**Liquid crystals and their applications (LC):** Introduction, meaning, positional and orientational order in solid, liquid crystals and liquids. Director. Classification – thermotropic and lyotropic with examples. Types of mesophases – Nematic, Chiral nematic (cholesteric), Smectic and Columnar – arrangements of molecules with examples. Liquid crystalline behavior in homologues series – PAA and MBBA series. Applications of liquid crystals in display systems – explanation of display working, mention of LCD devices.

### **Text Books:**

1. **P. C. Jain and Monica Jain** - A Text Book of Engineering Chemistry, Dhanapat Rai Publications, New Delhi, 17<sup>th</sup> Edition, 2018.
2. **R.V. Gadag and Nithyananda Shetty** - A Text Book of Engineering Chemistry, Medtech Publishers, 1<sup>st</sup> Edition, 2019.

### **Reference Books:**

1. **F. W. Billmeyer** - Text Book of Polymer Science, John Wiley & Sons, 4<sup>th</sup> Edition, 2007.
2. **M. G. Fontana, N. D. Greene** - Corrosion Engineering, McGraw Hill Publications, New York, 3<sup>rd</sup> Edition, 2005.
3. **B. R. Puri, L. R. Sharma & M. S. Pathania** - Principles of Physical Chemistry, S. Nagin Chand & Co., 48<sup>th</sup> Edition, 2019.
4. **G. A. Ozin and A. C. Arsenault** - Nanochemistry: A Chemical approach to Nanomaterials, RSC Publishing, 2005.
5. **S. Chandrashekar** - Liquid Crystals, Cambridge University Press, 2<sup>nd</sup> Edition, 2010.
6. **Peter J. Collings** - Introduction to Liquid Crystals, CRC Press, 2<sup>nd</sup> Edition, 2019.

### **Course Outcomes (COs):**

On completion of this course students will be able to:

1. Apply the knowledge of electrochemistry to improve the efficiency of batteries. (PO-1, PO-2, PO-7)
2. Interpret the reasons of corrosion, monitor and control by using the proper techniques. (PO-1, PO-2, PO-7)
3. Apply different conventional & renewable sources of energy to generate power. Have concept on rearing high octane quality fuels. (PO-1, PO-2, PO-7)
4. Analyze the water samples and will have the knowledge to obtain potable water using different techniques. (PO-1, PO-2, PO-7)
5. Apply the knowledge in synthesis of advanced polymers, conducting polymers and liquid crystal materials for different applications. (PO-1, PO-2, PO-7)

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## CONSTITUTION OF INDIA

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**Course Code:** HS13/23

**Credits:** 0:0:0

**Pre – requisites:** Nil

**Contact Hours:** 28L

**Course Coordinator:** Dr. Premila Swamy & Mrs. Kanya Kumari S

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### Course Contents:

#### Unit-I

Making of the Indian Constitution and its salient features, The Preamble, Fundamental Rights in detail, Exercise of rights & Limitations under Part III (Articles 12-35), relevant cases.

#### Unit-II

The Directive Principles of State Policy under part-IV, Fundamental Duties & their significance. Constitutional provisions for Women & Children, Provisions for protection of Minorities, SC&ST

#### Unit-III

The Union Executive - President & Vice President, Prime Minister & Council of Ministers, Union Legislature (Parliament) - composition & functions. The Union Judiciary - Supreme Court of India.

State executive - Governor, Chief Minister & council of ministers. State legislature and State judiciary.

#### Unit-IV

Local Government-Panchayath Raj system, Municipalities and Co-operative societies. Emergency provisions, Electoral process, Amendment procedure and Major Constitutional amendments - 42<sup>nd</sup>, 44<sup>th</sup>, 74<sup>th</sup>, 76<sup>th</sup>, 86<sup>th</sup> and 91<sup>st</sup> amendments.

#### Unit-V

Human Rights- Meaning and definitions, International perspectives – Universal Declaration of Human Rights (UDHR), specific themes in human rights.

Protection of Human rights Act 1993- Meaning, definitions and objectives. National Human rights commission of India (NHRC) - composition, tenure, powers & functions.

### Text Books:

1. **Durga Das Basu** - Introduction to Constitution of India, 22<sup>nd</sup> Edition, 2015
2. A Primer on Constitution of India & Professional Ethics, VTU Publication, 1<sup>st</sup> Edition, 2007

## **Reference Books:**

1. **M.V. Pylee** - An Introduction to Constitution of India, 4<sup>th</sup> Edition, 2004
2. **Brij Kishore Sharma** - Introduction to the Constitution of India, 3<sup>rd</sup> Edition, 2005

## **Course Outcomes (COs):**

At the end of the course the student will be able to

1. Identify the fundamental principles of Indian constitution. (PO-12)
2. Examine various provisions of Directive Principles of state policies & fundamental duties. (PO-6, PO-12)
3. Understand the powers of executive, legislature and judicial system. (PO-12)
4. Identify the role of election commission & local self government. (PO-12)
5. Understand about basic Human rights in India (PO-6, PO-12)

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## PROFESSIONAL COMMUNICATION AND LIFE SKILLS

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Course Code: HS14/24

Credits: 2:0:0

Pre – requisites: Nil

Contact Hours: 28L

Course Coordinator: Dr. Premila Swamy D

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### Course Contents:

#### Unit-I

##### **Fundamentals of Communication.**

1. Fundamentals of Communication, process, levels, forms, and barriers.
2. General and Technical Communication.
3. Nonverbal Communication, Body language and its significance.
4. Communication across cultures.

#### Unit-II

##### **Listening and Speaking skills.**

1. Listening skills-Definition of Listening, Listening V/S Hearing, Barriers to listening, Types of Listening, Significance of listening, Improving Listening Skills.
2. Speaking skills-Effective speaking, Presentation Strategies.

#### Unit-III

##### **Grammar, Reading skills and Professional Writing Skills.**

1. Parts of speech, usage of tense forms, correction of sentences.
2. Idioms and phrases, Commonly Confused Words.
3. Reading skills- Reading techniques-skimming, scanning, intensive and extensive reading.
4. Writing skills- Paragraph writing, Expansion of Ideas.
5. Letter writing, Report writing, E-mail etiquette.
6. Drafting a Resume and Job application.

#### Unit-IV

##### **Human values and Relationship Management.**

1. Human values- its significance, Social values, Integrity, Empathy, Character, Spirituality.
2. Relationship values-honesty, commitment, and compromise.
3. Building effective relations with peers and yourself.
4. Building effective relations with parents and elders.
5. Aspirations and parents' expectations.

## Unit-V

### **Self-Management skills: Self-esteem, positive attitude, and emotional intelligence.**

1. Stress Management-Introduction, significance and methods of Stress Management, Methods to recognize stress.
2. Anger Management
3. Time Management
4. Managing Emotions
5. Developing the right attitude
6. Self-esteem-acceptance of setbacks and success,
7. Goal Setting.

### **Text Books:**

1. **Meenakshi Raman & Sangeetha Sharma** - Technical communication, Principles and Practice Oxford University Press, 2007.
2. **A.J. Thomson & A. V. Martinet** - A Practical English Grammar, Oxford University Press, 1987.

### **Reference Books:**

1. **M Ashraf Rizvi** - Effective Technical Communication, McGraw Hill Education (India) Private Limited, 2005.
2. **Sanjayakumar** - Communication Skills, PushpLata, Oxford Press, 2016.
3. **S K. Khandelwal & R K Gupta** - Functional Grammar & Composition, Laxmi Publication (P) Ltd.
4. **N. Krishna Murthy** - Modern English Grammar, Trinity press, 2016.
5. **John Seely** – Guide to Speaking and Writing, Oxford, 2000.

### **Suggested Reading:**

NPTEL Course on Developing Soft Skills and Personality by Dr. Ravichandran.T IIT Kanpur.

### **Course Outcomes (COs):**

At the end of the course the student will be able to

1. Understand the basic concepts of Communication. (PO-10, PO-12)
2. Inculcate Listening & Speaking Skills accurately. (PO-10, PO-12)
3. Develop reading skills, writing skills & grammar accuracy. (PO-9, PO-10, PO-12)
4. Reinforce human values and cultural sensibilities (PO-9, PO-12)
5. Learn the life skills required for self-management. (PO-9, PO-12)

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## **BASIC ELECTRICAL ENGINEERING**

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**Course Code:** EE15/25

**Credits:** 2:1:0

**Pre – requisites:** Nil

**Contact Hours:** 28L + 14T

**Course Coordinator:** Sri. Gurunayk Nayak

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### **Course Contents:**

#### **Unit-I**

##### **Introduction to Electrical Power**

Introduction to generation, transmission and distribution of electrical power. AC and DC power. Concept of grid and need for interconnection of grids. Conditions for grid connection. Integration of renewable energy sources to grid- conditions and benefits. Types of loads. Concept of power and energy. Definition of Power Factor. Tariff structure for electrical energy consumption.

#### **Unit-II**

##### **Analysis of DC and AC Circuits**

Fundamentals of AC and DC waveforms, representation of AC and DC quantities, average and rms values, form factor, peak factor. Electric circuit analysis using Ohm's law and Kirchhoff's laws. Current and Voltage division rule. Analysis of DC circuits. Analysis of single phase AC circuits with R, L, C, RL, RC and RLC series and parallel configuration, Numericals.

#### **Unit-III**

##### **Introduction to Electrical Machines-I**

Faraday's laws. Static and dynamically induced EMF. Construction and working principle of DC Machine. DC Generator EMF equation. DC Motor Characteristics and applications. Necessity of starter, Numericals. Construction and working principle of single phase transformer. EMF equation and losses in transformer, Numericals.

#### **Unit-IV**

##### **Introduction to Electrical Machines-II**

Advantages of three phase circuits. Relation between line and phase quantities in STAR and DELTA connected systems. Construction and working principle of Synchronous Generator, EMF equation, Numericals.

Types of Induction motors and applications. Construction and working principle of three phase Induction Motor (Rotating magnetic field), slip, slip speed and frequency of rotor EMF, Numericals.

## Unit-V

### **Special Electrical Machines and Its Applications:**

Construction and working principle of BLDC Motor and Stepper Motor and their applications.

### **Protection and Safety of Electrical Systems:**

Introduction to domestic wiring, Fuse, MCB, ELCB and Relay. Necessity of earthing, difference between earthing and grounding and types of grounding. Electric shocks, hazards and safety precautions.

### **Text Books:**

1. **D. P. Kothari and I. J. Nagrath** - Basic Electrical Engineering, Tata McGraw Hill, 2010.
2. **D. C. Kulshreshtha** - Basic Electrical Engineering, McGraw Hill, 2009.

### **Reference Books:**

1. **E. Hughes** - Electrical and Electronics Technology, Pearson, 2010.
2. **V. D. Toro** - Electrical Engineering Fundamentals, Prentice Hall India, 1989
3. EPRI Handbook.

### **Course Outcomes (COs):**

At the end of the course, students will be able to :

1. Understand different types of energy sources and the concepts of generation, transmission and distribution of electrical power. (PO-1, PO-6)
2. Solve problems in DC and AC circuits. (PO-1)
3. Understand the construction and working of DC Machines. (PO-1)
4. Understand the construction and working of AC Machines. (PO-1)
5. Recognize the importance of protection and safety of electrical systems.(PO-6, PO-8)



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# FUNDAMENTALS OF COMPUTING

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Course Code: CS16/26

Credits: 2:0:0

Pre – requisites: Nil

Contact Hours: 28L

Course Coordinator: Darshana A Naik

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## Course Contents:

### Unit-I

**Overview and Problem Solving with C: Computing Systems:** Hardware and Software, **An Engineering problem –Solving Methodology:** Compute the straight-line distance between two points in a plane, Freezing Temperature of Seawater. **Overview of C:** Importance of C, Basic Structure of C Programs, UNIX System. **Constants, Variables and Data types:** Character Set, C-Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Defining Symbolic Constants. **Managing Input and Output Operations:** Reading a Character, Writing a Character, Formatted Output.

### Unit-II

**Operators and Expressions:** Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity. **Control Structures in C:** Algorithm Development, **Decision Making and Branching:** Simple IF statement, IF..Else Statement, Nesting of IF...Else, The Else IF Ladder, The Switch Statements. The GOTO Statement. **Decision Making and Looping:** Introduction, The While Statement, The DO statement, The FOR statement, Jumps in Loops.

### Unit-III

**Arrays and Matrices:** One-Dimensional Array, Two-Dimensional Arrays (Declaration and Compile Time and Run Time Initialization). Sorting Algorithms, Search Algorithms, **Character Arrays and Strings:** Introduction, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String Handling Functions, Other String Functions.

### Unit-IV

**User Defined Functions:** Introduction, Need for User-Defined Functions, Elements of User-Defined Functions, Definition of Functions, Return Values and Their Types, Function Calls, Categories of Functions, Recursion. **The scope, visibility and lifetime of variables:** Automatic variables, Static Variables, Register Variables, and External Variables. **Structures:** Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure variables, Arrays of Structures, Arrays within Structures.

## Unit-V

**Pointers:** Introduction, Understanding Pointers, Accessing the Address of a Variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a variable through its pointer, Pointer Expressions, Pointers and Arrays, Pointers and Character Strings, Pointers as Function Arguments.

**File:** Introduction to files, **Using files in C:** Declaring a File Pointer Variables, Opening a File, Closing a File Using fclose (). **Read data from files:** fscanf(), fgetc(), fgetc() and fread(). **Writing Data to Files:** fprintf(), fputs(), fputc() and fwrite().

### Text Books:

1. **E. Balagurusamy** - Programming in ANSI C, TMH, 7<sup>th</sup> Edition, 2016
2. **Delores M. Etter** - Engineering Problem Solving with C, Person Education, 3<sup>rd</sup> Edition, 2012
3. **ReemaThareja** - Programming in C, Oxford University press 2<sup>nd</sup> Edition, 2015

### Reference Books:

1. **Behrouz A Forouzan& Richard F Gilberg** - Computer Science: A Structural Programming Approach using C, Thomas Brooks publication, 2<sup>nd</sup> Edition, 2006.
2. **Yashvant Kanetkar** - Let Us C, BPB Publications, 15<sup>th</sup> Edition, 2016.

### Course Outcomes (COs):

At the end of the course, the students will be able to

1. Identify basic elements of computing systems to solve simple real world engineering problems (PO-1, PO-2, PSO-1)
2. Illustrate the use of control structures, decision making and looping statements (PO-1, PO-2, PSO-1)
3. Implement the concepts and techniques related to arrays and matrices (PO-1, PO-2, PSO-1)
4. Construct a programming solutions using user defined functions and structures (PO-1, PO-2, PSO-1)
5. Illustrate the concepts of pointers and files (PO-1, PO-2, PSO-1)

**Note:** The topics discussed in tutorials of the Course CSL18/CSL28 Fundamentals of Computing and C Programming Laboratory will be a part of CIE and SEE assessment of this Course.

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## ENGINEERING CHEMISTRY LABORATORY

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Course Code: CYL17/27

Credits: 0:0:1

Pre – requisites: Nil

Contact Hours: 14P

Course Coordinator: Dr. B. M. Nagabhushana & Dr. Nagaraju Kottam

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### Course objectives:

#### The objective of this course is students to:

1. Provide the primary skills in quantitative estimation of different engineering materials with conventional and instrumental techniques.
2. Train the students to estimate the impurities present in water by different techniques.
3. Provide procedural knowledge for chemical analysis of alloys and corroded products.
4. To acquire skills in handling simple electroanalytical and optical instruments in chemical analysis.
5. Gain the knowledge for the synthesis of polymeric and nanomaterials.

### Course Content:

1. Determination of total hardness of water sample by EDTA method.
2. Determination of COD of an industrial waste water sample.
3. Determination of amount of iron present in the rust solution.
4. Determination of % Cu in brass by iodometric method.
5. Colorimetric estimation of metal ions (Copper) in effluent water.
6. Determination of amount of chloride present in water sample by Argentometric method
7. Estimation of sodium /potassium present in water sample by Flamephotometry.
8. Determination of amount of HCl and  $\text{CH}_3\text{COOH}$  present in an acid-mixture by conductometry.
9. Estimation of FAS present in the given solution potentiometrically.
10. Determination of pKa value of the given weak acid using pH meter.
11. Preparation of Urea –formaldehyde polymeric material.
12. Determination of amount of sulphate present in water sample by gravimetric method
13. Synthesis of nanomaterials by solution combustion method (Demo).
14. Determination of single electrode potential using secondary reference electrode and verification of Nernst equation (Demo).

## Reference books:

1. Vogel's quantitative Chemical Analysis, Pearson Publication, 6<sup>th</sup> Edition, 2009.
2. **Clair N. Sawyer and Perry L, Mc. Carty** - Chemistry for Environmental Engineering, Mc. Graw-Hill Book Company, New York, 5<sup>th</sup> Edition, 2003.
3. Chemistry Manual – RIT, 2020-21.

## Course Outcomes (COs):

On completion of this course students will be able to:

1. Handle the apparatus in chemical laboratories for analysis of various materials. (PO-1, PO-2, PO-7)
2. Analyze the suitability of water for domestic and industrial consumption. (PO-1, PO-2, PO-7)
3. Evaluate the content and composition of new materials encountered in engineering applications. (PO-1, PO-2, PO-7)
4. Enumerate various instruments in professional and research activities. (PO-1, PO-2, PO-7)
5. Apply the knowledge of synthetic procedures for the polymeric and nanomaterials. (PO-1, PO-2, PO-7)

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## FUNDAMENTALS OF COMPUTING AND C- PROGRAMING LABORATORY

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**Course Code:** CSL18/28

**Credits:** 0:1:1

**Pre – requisites:** Nil

**Contact Hours:** 28T + 28P

**Course Coordinator:** Darashana A Naik

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### Course Content:

1. Basic LINUX Commands, Libreoffice Writer, Spreadsheets(Calc),Databases(Base)
2. C-Programming: Using Operators,
3. C-Programming: Using Conditional Statements
4. C-Programming: Using Switch Case and GOTO Statement
5. C-Programming: Using Iterative Statements
6. C- Programming: Using One Dimensional Arrays
7. C- Programming: Using Two Dimensional Arrays
8. C -Programming :Using Character array and Strings
9. C- Programming: Using Functions
10. C- Programming: Using Structures
11. C- Programming: Using Pointers
12. C- Programming: Using Files

### Reference Books/Links:

1. **E. Balagurusamy** - Programming in ANSI C, TMH, 7<sup>th</sup> Edition, 2016
2. **Behrouz A Forouzan & Richard F Gilberg** - Computer Science: A Structural Programming Approach using C,Thomas Brooks publication, 2<sup>nd</sup> Edition, 2006.
3. **Yashvant Kanetkar** - Let Us C, BPB Publications, 15<sup>th</sup> Edition, 2016.
4. **Reema Thareja** - Programming in C, 2<sup>nd</sup> Edition, Oxford University press 2015
5. <https://www.libreoffice.org/get-help/documentation/>

### Course Outcomes (COs):

At the end of the course, the students will be able to:

1. Recall basic UNIX commands and prepare a Document, spreadsheet and Database using Libre Office (PO-1, PO-2, PO-5)
2. Write C-programs using language constructs such as Operators, Conditional and Iterative Statements.(PO-1, PO-2, PO-5)

3. Write C-programs to implement concepts related to arrays, functions, Strings, structures, pointers and Files (PO-1, PO-2, PO-5)

**Note:**

- **The exercises based on the above topics will be formulated and discussed in the Tutorial Class.**
- **Each student will be given two manuals, one for the tutorial class (the student will write the solutions for the tutorial exercises) and one for the Laboratory (the student will write the executed program in the Lab class)**

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# COMPUTER AIDED ENGINEERING DRAWING

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Course Code: ME19/29

Credits: 0:1:1

Pre – requisites: Nil

Contact Hours: 14T + 14P

Course Coordinator: Dr. Sridhar B S

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## Course Content:

### Unit-1

**CAD Software:** Learning the drawing commands such as point, line, arc, circle, ellipse, rectangle, polygons etc. Modify commands such as copy, move, mirror, rotate, pattern, scale etc. Dimensions, linear, aligned, radial, angular, etc.

**Orthographic projections:** Projection of points (I and III Quadrant), projection of lines.

**Projection of Planes:** Projection of Planes such as triangle, square, rectangle, pentagon, hexagon and circle.

### Unit-II

**Projection of Solids:** Projection of Solids such as cube, prism, pyramid, cylinder, Cone and tetrahedron (No problems on freely suspended from corner and drawing profile view when three positions involved).

### Unit-III

**Isometric Projection:** Isometric scale, isometric projection of simple solids & their frustums, combination of two solids (Co axial).

### Text Books:

1. **K R Gopalakrishna** - Engineering Drawing, Subhas publishers, Bangalore.
2. **N D Bhat & V M Panchal** - Engineering Drawing, Charota Publishing house, Gujarat.

### Reference Books :

1. **N.S Parthasarathy & Vela Murali** - Engineering Drawing, Oxford University Press.
2. **Luzadder Warren J. Duff John M** - Fundamentals of Engineering Drawing with an introduction to interactive Computer Graphics for Design and Production, Eastern – Prestice Hall of India Pvt Ltd, New Delhi
3. A Primer on computer aided Engineering Drawing, Published by VTU, Belgaum, 8<sup>th</sup> Edition, 2011.

## **Course Outcomes (COs):**

At the end of the course, students will be able to :

1. Demonstrate the usage of a CAD software for creating engineering drawings: commands such as draw, copy, move, mirror, rotate, dimensioning. (PO-1, PO-5, PO-9, PO-10, PO-12)
2. Sketch and draw using the CAD software, the orthographic projections of the following with various conditions of position and orientation: points, lines, Planes and Solids. (PO-1, PO-5, PO-9, PO-10)
3. Sketch and draw using the CAD software Isometric projection of a combination of two coaxial solids. (PO1, PO-5, PO-9, PO-10).



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## ENGINEERING DESIGN

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**Course Code:** AL11/21

**Credits:** 0:0:1

**Pre – requisites:** Nil

**Contact Hours:** 14P

**Course Coordinator:** Respective Department Faculty

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### Course Content:

This course will provide an introduction to engineering design process. Students will work in a group of 4/5 to solve a problem of current concern requiring an engineering solution. They are required to follow a systematic approach towards developing the solution by considering technical and non-technical factors. The working model of the solution along with the design documentation will be considered for final evaluation.

### References:

1. [http://www.saylor.org!site/wp-content/uploads/2012/09/IME1\\_01-4-I-Engineering-Design-Process.pdf](http://www.saylor.org!site/wp-content/uploads/2012/09/IME1_01-4-I-Engineering-Design-Process.pdf)
2. <http://ocw.mit.edu>

### Course Outcomes (COs):

At the end of the course, the students will be able to:

1. Define the problem to be solved in a clear and unambiguous terms. (PO-1)
2. Identify and establish the need to solve the problem by gathering relevant literature. (PO-1)
3. Generate multiple solutions, analyze and select one solution. (PO-3, PO-4, PO-5)
4. Test and implement the solution as a team. (PO-9, PO-10)
5. Document and present the solution to the peer group. (PO-10, PO-12)