



UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING  
K R Circle, Bengaluru-560 001.

## Choice Based Credit System (CBCS)

Academic Rules and Regulations 2018  
(Undergraduate Programmes in Engineering & Architecture)

# BANGALORE UNIVERSITY



## VISION

“To strive for excellence in education for the realization of a vibrant and inclusive society through knowledge creation and dissemination”

## MISSION

- Impart quality education to meet national and global challenges
- Blend theoretical knowledge with practical skills
- Pursue academic excellence through high quality research and publications
- Provide access to all sections of society to pursue higher education
- Inculcate right values among students while encouraging competitiveness to promote leadership qualities
- Produce socially sensitive citizens
- Hasten the process of creating a knowledge society
- To contribute to nation building

Bangalore University  
**UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING**  
K R Circle, Bengaluru - 560 001.

University Visvesvaraya College of Engineering (UVCE) was started as a School of Mechanical Engineering by Bharat Ratna Sir. M. Visvesvaraya in the year 1913 to meet the needs of the State for skilled workers with S V Setty as its Superintendent. Later, it was converted to a full-fledged Engineering College in the year 1917 under the name Government Engineering College and was affiliated to the University of Mysore. It is the fifth Engineering College to be established in the country.

After the formation of Bangalore University in 1964, UVCE became one of the Constituent Colleges of Bangalore University. This is one of the oldest Institutions in the country imparting technical education leading to B.E., M.E, B.Arch., M.Sc. (Engineering), M.Arch. and Ph.D. degrees in various disciplines of Engineering and Architecture. The Institution currently offers 7 Undergraduate (B.E. / B.Arch.) Full-time, three Undergraduate (B.E.) Part-time and 24 Postgraduate (M.E. / M.Arch.) Programmes.

## **VISION**

The vision of UVCE is to strive for excellence in advancing engineering education through path breaking innovations across the frontiers of human knowledge to realize a vibrant, inclusive and humane society.

## **MISSION**

The mission of UVCE is to prepare human resource and global leaders to achieve the above vision through discovery, invention and develop friendly technologies to promote scientific temper for a healthy society. UVCE shapes engineers to respond competently and confidently to the economic, social and organizational challenges arising from globally advancing technical needs.

**Bangalore University**  
**UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING**  
**Bengaluru**

Vision, Mission, Program Educational Objectives (PEOs), Program Specific Objectives (PSOs), Program Outcomes (POs) of the B.Tech. Programmes of the following Departments of UVCE, Bangalore University Bangalore:

1. Department of Civil Engineering.
2. Department of Mechanical Engineering.
3. Department of Electrical and Electronics Engineering.
4. Department of Electronics and Communication Engineering.
5. Department of Computer Science and Engineering.
6. Department of Architecture.

**BANGALORE UNIVERSITY, BENGALURU  
DEPARTMENT OF CIVIL ENGINEERING, UVCE,  
Name of programme: B.Tech. in Civil Engineering  
Outcome Based Education Curricula (Academic Year 2018-19)**

**Vision of the Department**

To be front runner in academic activities in the field of Civil Engineering to bring out Civil Engineers with high technical competencies.

**Mission of the Department**

**CVM1:** By providing quality education to the students with the fundamental background necessary for an active successful professional career in Civil Engineering, in general.

**CVM2:** Imparting knowledge and enlighten students to make them competent, self-motivated and expanding their knowledge skills through continuous education, and to inculcate human values and concern for environment and the society.

**CVM3:** Promote Entrepreneurship to strengthen the economy and society.

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The graduates will be able to:

**CVPEO1:** Excel in their professional career by practicing factual, analytical, procedural, application in the field of computing and Civil Engineering.

**CVPEO2:** Perceive higher education in the field of Civil Engineering/Mangement.

**CVPEO3:** Apply the principles of sustainable development and global interconnectedness to solve societal and environmental issues.

**CVPEO4:** Use the techniques, skills, and modern engineering tools necessary for Civil Engineering and work as a team members.

## **PROGRAM OUTCOMES**

**Civil Engineering Graduates will be able to:**

**CVPO1: Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

**CVPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of Mathematics, natural Science, and Engineering Sciences.

**CVPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and Environmental considerations.

**CVPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**CVPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern Engineering and information technology tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

**CVPO6: 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.

**CVPO7: Environment and Sustainability:** Understand the impact of the professional Engineering solutions in societal and Environmental context, and demonstrate the knowledge of, and need for sustainable development

**CVPO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.

**CVPO9: Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**CVPO10: 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 report and design documentation, make effective presentation, and give and receive clear instruction.

**CVPO11: 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.

**CVPO12: 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.

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

The graduate will be able to:

**CVPS01:** Analyse soil-structure interaction and design of buildings/structures.

**CVPS02:** Plan, analyse and design of transportation and water supply/wastewater systems.

**CVPS03:** Analyse and design of irrigation and water resource projects.

**Bangalore University Bengaluru**  
**Department of Mechanical Engineering, UVCE,**  
**Name of programme: B.Tech in Mechanical Engineering**  
**Outcome based Education curricula (Academic Year 2018-19)**

### **Vision of the Department**

Strive for Centre of Excellence in advancing Mechanical Engineering education to produce highly qualified human resources to meet local and global requirement.

### **Mission of the Department**

**MEM1.** Implementing effectively, the outcome based education by imparting knowledge of basics and advances in Mechanical Engineering and other allied disciplines.

**MEM2.** Preparing and equipping human resources to become global leaders through innovation, discovery, sustainable and environment friendly technology.

**MEM3.** Creating conducive environment for effective teaching and learning process through interdisciplinary research, online courses, interaction with institutions of higher learning and industries, R and D laboratories of national importance, alumini, employers and other internal & external stake holders.

**MEM4.** Imbibing awareness of entrepreneurship, ethics, honesty, credibility, social and environmental consciousness and providing opportunity to the faculty and technical staff for continuous academic improvement and to equip them with the latest trends in Mechanical Engineering and thereby inculcate the habit of continuous learning in faculty, staff and students.

### **Program Educational Objectives (PEO)**

**MEPEO1:** Graduates shall have successful career in the field of mechanical and other allied fields of engineering with a thorough knowledge of the fundamentals and applications in Mechanical Engineering, including pursuing of higher studies in Mechanical Engineering and Management.

**MEPEO2:** Graduates shall be able to solve problems by adopting analytical, numerical, experimental and managerial skills keeping in view of the societal and environmental impact with a focus on research, development and innovation in Design, Manufacturing, Materials and Thermal engineering.

**MEPEO3:** Graduates shall have effective communication skills and ability to work individually and in team, zeal for entrepreneurship and involve in lifelong learning.

**Program Outcomes (PO):**

**Mechanical Engineering graduates will be able to:**

**MEPO1: Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**MEPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science, and engineering sciences.

**MEPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations.

**MEPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**MEPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern engineering and information technology tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**MEPO6: 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.

**MEPO7: Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental context, and demonstrate the knowledge of, and need for sustainable development

**MEPO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**MEPO9: Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**MEPO10: 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 report and design documentation, make effective presentation, and give and receive clear instruction.

**MEPO11: 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.

**MEPO12: 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.

**Program Specific Outcomes (PSO):** The graduates will be able to

**MEPSO1:** Design mechanical systems and conduct performance tests by applying the basics and advances in the field of Design and Thermal Engineering.

**MEPSO2:** Compare the capabilities of different manufacturing processes including latest advancements in applications of computers in Automation and Manufacturing.

**MEPSO3:** Characterise and compare the different materials for Engineering application.

**Bangalore University Bengaluru**  
**Department of Electrical Engineering, UVCE, Bengaluru**  
**Name of programme: B.Tech. in Electrical and Electronics Engineering**  
**Outcome based Education curricula (Academic Year 2018-19)**

**Vision of the Department:**

To impart quality education to produce world class Electrical and Electronics Engineers who can meet the challenges of the ever growing technological needs.

**Mission of the Department:**

Establish the state of the art facilities for research & innovation to serve the industry and community through inclusive growth and development.

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

The PEOs have been evolved in alignment with the vision and mission of the Department. The broad objective of the program is to facilitate the development of competent and successful professionals in line with modern day technological and societal requirements. Therefore, after concerted interactions (both formal and informal) with all major stakeholders including Alumni, Employers, experts from industry and research laboratories, faculty and students, parents and others, the Program Educational Objectives of the UG course offered by Department of Electrical and Electronics Engineering have been arrived at as follows:

**The PEOs of the program are as under:**

**EEPEO1:** Possess successful careers in Electrical and Electronics Engineering and allied areas and pursue higher education with a broad knowledge base in Mathematics and Engineering principles.

**EEPEO2:** Utilize their technical, analytical, communicative and managerial skills and knowledge for societal progress and enrich them to keep in pace with relevant advancement by engaging themselves in lifelong learning.

**EEPEO3:** Exhibit professionalism by displaying competence, leadership, dedication and commitment.

## **Program Outcomes:**

**EEPO1: Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

**EEPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of Mathematics, natural Science, and Engineering Sciences.

**EEPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and Environmental considerations.

**EEPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**EEPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern Engineering and information technology tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

**EEPO6: 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.

**EEPO7: Environment and Sustainability:** Understand the impact of the professional Engineering solutions in societal and Environmental context, and demonstrate the knowledge of, and need for sustainable development

**EEPO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.

**EEPO9: Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**EEPO10: 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 report and design documentation, make effective presentation, and give and receive clear instruction.

**EEPO11: 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.

**EEPO12: 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.

## PROGRAM SPECIFIC OUTCOMES

The students will have the ability to:

**EEPSO1:** Develop models, analyze and assess the performance of different types of generation, transmission, distribution and protection mechanisms in power systems.

**EEPSO2:** Design, develop, analyze and test electrical and integrated electronics systems; deploy control strategies for power electronics related and other applications.

**EEPSO3:** Measure, analyze, model and control the behaviour of electrical quantities associated with constituents of energy or allied systems.

**Bangalore University Bengaluru**  
**Department of Electronics and Communication Engineering, UVCE**  
**Name of programme: B.Tech. in Electronics and Communication Engineering**  
**Outcome Based Education curricula (Academic Year 2018-19)**

**Vision of the Department**

To strive for academic excellence in the field of Electronic and communication Engineering through knowledge assimilation, creation and dissemination to augment human resource capital.

**Mission of the Department**

- (1) To impart quality education and skills through state of the art curriculum and facilities to produce intellectual minds for advancing frontiers of Electronics and Communication Engineering.
- (2) To pursue academic excellence through quality teaching, research and innovation.
- (3) To inculcate the values of academic integrity and accountability.

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

Graduates will be able to

**PEO1:** Pursue career in the field of Electronics and Communication and allied areas.

**PEO2:** Analyze, design, model and test electronic devices, digital and analog circuits in communication, Signal processing and VLSI.

**PEO3:** Pursue higher education and will exhibit Professionalism by displaying competence, leadership and effective communication skill.

## **Program outcomes**

**ECPO1: Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

**ECPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of Mathematics, natural Science, and Engineering Sciences.

**ECPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and Environmental considerations.

**ECPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**ECPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern Engineering and information technology tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

**ECPO6: 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.

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**ECPO11: 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.

**ECPO12: 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.

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

**PSO1:** Identify and apply the knowledge of basic science subjects and engineering to solve problems of Electronics and Communication Engineering.

**PSO2:** Design, develop, analyze, test and model electronic and communication systems by applying basics and advances in them and in allied fields.

**PSO3:** Ability to work in multi disciplinary teams by possessing effective communication skills.

**PSO4:** Exhibit professional ethics with a habit of self and lifelong learning including the possibility to venture into entrepreneurship.

**Bangalore University, Bengaluru**  
**Department of Computer Science and Engineering, UVCE**  
**Outcome Based Education curricula (Academic Year 2018-19)**

### **Vision of the Department**

Strive for excellence in Computer Engineering Education and Research to develop knowledge, talent, and leadership for ever growing IT requirements.

### **Mission of the Department**

**CSEM1:** Impart quality education and promote scientific temper, leadership qualities.

**CSEM2:** Pursue academic excellence through quality teaching and research.

**CSEM3:** Blend theoretical knowledge with practical skills.

### **The department offers 2 UG Programmes:**

1. Computer Science and Engineering
2. Information Science and Engineering

## **(1)B.Tech. Program in Computer Science and Engineering**

### **PROGRAM EDUCATIONAL OBJECTIVES (PEO)**

Students will be able to

**CSEPEO1:** Have successful career as Computer Science engineers with a sound knowledge of fundamentals.

**CSEPEO2:** Solve problems by adopting analytical, numerical, experimental and managerial skills keeping in view of societal impact.

**CSEPEO3:** Communicate effectively and work individually and in team.

**CSEPEO4:** Inculcate awareness and commitment to professional ethics, lifelong learning and promoting entrepreneurship.

### **Program Outcomes**

**Computer Science and Engineering Graduates will be able to:**

**CSPO1: Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

**CSPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of Mathematics, natural Science, and Engineering Sciences.

**CSPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and Environmental considerations.

**CSPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**CSPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern Engineering and information technology tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

**CSPO6: 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.

**CSPO7: Environment and Sustainability:** Understand the impact of the professional Engineering solutions in societal and Environmental context, and demonstrate the knowledge of, and need for sustainable development

**CSPO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.

**CSPO9: Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**CSPO10: 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 report and design documentation, make effective presentation, and give and receive clear instruction.

**CSPO11: 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.

**CSPO12: 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.

## **PROGRAM SPECIFIC OUTCOMES (PSO)**

**CSEPSO1:** Identify and apply the knowledge of computer engineering concepts to solve the current IT problems.

**CSEPSO2:** Design, analyse and implement network, mobile, web-based and security applications using the state-of-art technologies, standards and tools.

## **(2) B.Tech. Program in Information Science and Engineering**

### **PROGRAM EDUCATIONAL OBJECTIVES (PEO)**

Students will be able to

**ISEPEO1:** Excel as Information Science Engineers with adaptive and agile skills in information processing.

**ISEPEO2:** Have successful careers in industry, research organisations and institutions of higher learning.

**ISEPEO3:** Solve problems by adopting analytical, numerical and experimental skills in IT industries.

**ISEPEO4:** Cultivate professional ethics, lifelong learning and effective communication.

### **Program Outcomes**

#### **Information Science and Engineering Graduates will be able to:**

**ISPO1: Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

**ISPO2: Problem Analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of Mathematics, natural Science, and Engineering Sciences.

**ISPO3: Design/development of solution:** Design solutions for complex Engineering problems and design system components or processes that need the specified needs with appropriate consideration for the public health and safety, cultural, societal, and Environmental considerations.

**ISPO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, synthesis of the information to provide valid conclusions.

**ISPO5: Modern tool usage:** Create, select and apply appropriate techniques, resources and modern Engineering and information technology tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

**ISPO6: 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.

**ISPO7: Environment and Sustainability:** Understand the impact of the professional Engineering solutions in societal and Environmental context, and demonstrate the knowledge of, and need for sustainable development

**ISPO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.

**ISPO9: Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**ISPO10: 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 report and design documentation, make effective presentation, and give and receive clear instruction.

**ISPO11: 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.

**ISPO12: 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.

## **PROGRAM SPECIFIC OUTCOMES (PSO)**

**ISEPSO1:** Identify and apply the knowledge of basic information science engineering concepts to solve the current IT problems.

**ISEPSO2:** Develop IT based applications using the state -of -art technologies, standards and tools.

Bangalore University  
**UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING**  
K R Circle, Bengaluru 560 001

## Choice Based Credit System (CBCS)

### Academic Rules and Regulations 2018

(Undergraduate Programmes in Engineering & Architecture)

## PART-I: B.Tech. (Undergraduate Programmes in Engineering)

## PART-II: B.Arch. (Undergraduate Programmes in Architecture)

# **Choice Based Credit System (CBCS)**

## **PART-I**

**(Undergraduate Programmes in Engineering - B.Tech.)**

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# **CHOICE BASED CREDIT SYSTEM (CBCS)**

## **Preamble:**

The University Grants Commission, New Delhi in its 12<sup>th</sup> Plan Guidelines directed the Universities in the country to implement the Choice Based Credit System (CBCS) to set a benchmark in the University and fulfil expectations of all the stakeholders.

## **1. OBJECTIVES**

1. Shift in focus from Teacher-Centric to Learner-Centric education.
2. Allows students to choose according to their learning needs, interests and aptitudes.
3. Provides flexibility to the students allowing them to choose inter-disciplinary Courses, change majors, programs, etc.
4. Makes education broad-based. Students can earn credits by choosing unique combinations.
5. Helps self-paced learning with flexibility. Students can opt for as many as maximum 24 credits per term including backlog (if any) that must be considered first while counting credits.
6. A student can exercise the option to decide his/her own pace of learning- slow, normal or accelerated plan and sequence the choice of Courses, learn to face challenges through term/project work and may venture out to acquire extra knowledge/proficiency through add-on Courses.
7. Offers opportunity to study at different times and in different places. Credits earned at one Institution can be transferred to another.

## **2. SHORT TITLE AND COMMENCEMENT**

- 2.1 The academic rules and regulations listed under this head are common to all undergraduate B.Tech Programmes.
- 2.2 The academic rules and regulations are subject to amendments as may be made by the Academic Council of the College / University from time to time, keeping in view the recommendations of the Board of Studies. Any or all such amendments from such date and to such batches of candidates including those already undergoing the Programme, will be effective as may be decided by the Academic Council.

### **3. DEFINITIONS**

- (a) University: Bangalore University, Bengaluru (BUB).
- (b) College: University Visvesvaraya College of Engineering (UVCE).
- (c) Commission: University Grants Commission (UGC).
- (d) Council: All India Council for Technical Education (AICTE).
- (e) Council of Architecture (COA)
- (f) Statutes: Bangalore University Statutes.
- (g) Academic Autonomy: Freedom granted by the University to the College in all aspects of conducting its academic Programmes for promoting academic excellence.
- (h) Autonomous College: A College notified as an autonomous College as per the Bangalore University Statutes / UGC.
- (i) Programme: An educational Programme leading to award of a Degree, Diploma or Certificate.
- (j) Regular Students: Students who are admitted to B.Tech. or B.Arch. Programmes after PUC (10+2) or equivalent.
- (k) Lateral Entry Students: Students who are admitted to the third semester Engineering (second year) Programme after completing Diploma in the respective discipline both for Day and Evening Programmes.
- (l) Degree: B.Tech / B.Arch. undergraduate Degree.
- (m) Branch: Specialization in a Programme, for example, B.Tech. Degree Programme in Civil Engineering or B.Tech. Degree Programme in Computer Science and Engineering or B.Arch. Degree Programme in Architecture etc.
- (n) Course: A subject either theory or practical, identified by its title and the code number. For example, Engineering Mathematics-I is a course offered in the First Semester and its code is 18BSEM101. All courses need not carry the same credit. The courses should define learning objectives and learning outcomes. A course may be designed to comprise Lectures/ Tutorials/Laboratory Work/ Field Work/ Outreach Activities/ Project Work/ Vocational Training/Viva/ Seminars/ Term Papers/Assignments/ Presentations/ Self-Study etc. or a combination of these.
- (o) Semester: A semester shall consist of 15-19 weeks of academic work.
- (p) Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (Core, Elective or Minor or Soft Skill Courses).
- (q) Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching lecture or two hours of tutorial or two hours of practical work/field work per week. One credit is also equivalent to four hours of self study by students.
- (r) Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.
- (s) Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
- (t) Credit Point: It is the product of grade point and number of credits for a course.
- (u) Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

(v) Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

(w) Grade Card: A grade card shall be issued to all the registered students after every semester based on the grades earned. The grade card shall display the course details (Code, Title, Number of Credits, Grade secured) along with SGPA of that semester and CGPA and the number of credits earned till that semester.

#### 4. NOMENCLATURE OF ACADEMIC PROGRAMMES

4.1. The nomenclature and the corresponding abbreviations shown in Table 1, shall be used for the Degree Programmes under the University, as required by the Commission, AICTE and COA:

- (i) Bachelor of Technology (B.Tech.)
- (ii) Bachelor of Architecture (B. Arch.)

Besides, the Branch / Programme of specialization, if any, shall be indicated in the brackets after the abbreviation.

For example, Degree in Mechanical Engineering Programme is abbreviated as B.Tech. (Mechanical Engineering).

4.2. The Undergraduate (UG) Degree Programmes offered by the College are listed in Table 1.

**Table 1. UG Programmes and their Abbreviation**

Sl. No.	Title of the UG Programme	Abbreviation
1	Civil Engineering	CV
2	Mechanical Engineering	ME
3	Electrical and Electronics Engineering	EE
4	Electronics and Communication Engineering	EC
5	Computer Science and Engineering	CS
6	Information Science and Engineering	IS
7	Architecture	AR

**NOTE: For the B.Arch. programme, the detailed regulations for the admission process, curriculum framework, credit allocation, scheme of studies and examinations, Continuous Internal Evaluation (CIE), Semester End Examination (SEE), vertical progression and other norms are placed in Part II of CBCS Academic Rules and Regulations 2018 (Undergraduate Programmes in Architecture).**

#### 5. DURATION OF THE ACADEMIC PROGRAMMES

As Choice Based Credit System is followed, the Programme duration shall be dictated by the period in which a student earns the prescribed number of credits for the award of Degree.

### **5.1. Normal Duration**

- 5.1.1. The duration of B.Tech. programme for regular students shall be four years.
- 6.1.2. The duration of B.Tech. programme for lateral entry students shall be three years.

### **5.2. Maximum Duration**

- 5.2.1. The maximum duration that a student can take to complete a full time academic Programme shall be twice the normal duration of the Programme, i.e., eight years for regular students, six years for Lateral Entry (Regular) and Lateral Entry (Evening programme) course students to obtain B.Tech. Degree.
- 5.2.2. The maximum duration for a Programme shall also be dictated by the fact that a student has to demonstrate the prescribed minimum academic performance by registering for the prescribed minimum number of credits in every semester, for continuing with the Programme. This duration can be equal to or lower than the maximum period as indicated in 5.2.1.

### **5.3. Admission of Students**

- 5.3.1. The admission of students to various UG Degree Programmes listed in Table 1 shall be made by following the State / Central Government and/or University Policies/Practices.
- 5.3.2. The candidates with a Diploma or any other equivalent qualification approved by the Council and the Commission are eligible to join the Degree Programmes at the beginning of the second year (third semester), as per the prevailing practice in the College / University (Lateral Entry).
- 5.3.3. The students can migrate from one branch or specialization to another branch or specialization in the same College at the beginning of the second year (third semester) following the prevailing AICTE/State Government norms and as amended from time to time. This clause is applicable to migration of students from other colleges and vice versa.
- 5.3.4. The eligibility criteria for admission of students to UG Degree Programmes shall be the same as those prescribed by the State Government / University / College from time to time.

### **5.4. Semester Scheme**

The semester scheme is adopted for all the B.Tech. programmes

### **5.5. Academic Calendar**

An academic year consists of two regular semesters and a fast track semester, the details of which are shown in Table 2.

**Table 2: Typical Schedule of the Academic Year**

<b>Sl. No.</b>	<b>Activity</b>	<b>Description</b>	
1	Number of semesters in an academic year	Two regular semesters (Odd and Even) and one Fast Track Semester	
2	Duration of Regular Semester	19 weeks	
3	Duration of Fast Track Semester	08 weeks	
4	Academic activities (duration in weeks)	Regular Semester(s)	Fast Track Semester
	Course Registration	01 Day	01 Day
	Course Work including CIE	15 Weeks	06 Weeks
	Examination preparation, SEE, Valuation, Re-evaluation and Declaration of Results.	04 Weeks	02 Weeks
5	Evaluation	Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) shall have equal weightage in the student's performance in Course/Laboratory Work and other activities.	
6	Re-registration	Students failing in any Course(s) shall re-register for the same Course(s) and shall appear for CIE and SEE afresh in each <b>such</b> Course(s). This shall continue until a pass grade is obtained in the said course(s).	
7	Fast Track Semester at the end of Even Semester	Fast Track Semester may be conducted for failed students before the commencement of the next semester.	

## **6. PROCTOR SYSTEM**

### **6.1. Introduction**

The Proctor system makes the students punctual and helps them to complete their studies successfully. The faculty is the Proctor and the student is the Procree.

### **6.2. Objective(s)**

- 6.2.1. To guide and fulfil the academic requirements of the students.
- 6.2.2. To advise the students appropriately from time to time.
- 6.2.3. In addition, the Procree shall respond positively to fulfil 6.2.1 and 6.2.2.

### **6.3. Roles and Responsibilities**

- 6.3.1. The proctor shall monitor the student who fails to satisfy minimum attendance (75 %) and internal marks (40 %) in all Courses, as per Regulations.

- 6.3.2. The Proctor and Procree shall maintain updated diary, complete in all respects from time to time.
- 6.3.3. The proctor shall arrange for a meeting with the students at least once in a month and submit the proceedings to the concerned Chairpersons of the Department.
- 6.3.4. The proctor shall invite the parents for discussion at least once in every semester to update the academic progress of their ward, in case of non-performing and irregular students.
- 6.3.5. The Proctor shall arrange to send the progress reports to the Parents/Guardian regarding the details of Attendance, Test Marks, Examination results etc.
- 6.3.6. Proctor shall ensure that the students should not indulge in any sort of ragging activity inside the campus/hostel.

#### **6.4. Expected Outcome**

Results in enhanced performance and holistic development of the students.

### **7. CREDIT SYSTEM**

#### **7.1. General**

7.1.1. The Choice Based Credit System (CBCS) comes into effect from the academic year 2018-2019. The students have the option of choosing from a wide range of electives offered in the Department, Cluster of Departments and the Institution. In addition, Value-added Credit Courses are offered as part of extended learning in interdisciplinary and multi-disciplinary domains.

- 7.1.2. Credit Definition: one credit is assigned in the regular semester (odd/even) for:
- a) Theory Course conducted for one Hour/Week.
  - b) Tutorials and Practical classes (Laboratory Courses) conducted for Two Hours/Week respectively.
  - c) Self-Study in a Course by students, for four Hours/Week.

However, in case of fast track semester, the Course load is multiplied by Two. These guidelines form the basis to fix semester Course load and weekly contact hours in the Regular/Fast track semesters.

7.1.3 One hour of contact means 60 minutes.

7.1.4. The workload of teachers shall be calculated as shown in Table 3.

**Table 3: Workload computation for teachers.**

Teaching Component	No. of Hours	Workload in Hours / Units
Direct teaching - Theory	1	1
Tutorial	1	1
Practical class	3	2

Note: Other student activities like practical training, study tours, project tours, industrial visits are mandatory and shall not carry any credits.

- 7.1.5. Course Registration: A student shall register for the Courses to earn credits to meet the requirements of the Degree Programme. Such Courses together with their grades and the credits earned shall be included in the Grade Card issued by the University / College at the end of each semester and it forms the basis for determining student's academic performance in that semester.
- 7.1.6. Value Added Audit Courses: In addition, a student can register for Courses such as value added Courses for audit only in view to supplement his/her knowledge and/or skills. But, these shall not be taken into account in assessing the students' academic performance in the semester.

## 7.2. Credit Structure

- 7.2.1. A typical Credit Structure for Course work (Hour/Week in a Semester) in B.Tech. Programme is shown in Table 4.

**Table 4: Credit Structure**

Course	No. of hours/week				Credits
	L	T	P	S	
EFG	2	2	0	0	3.0
ABC	0	0	3	0	1.5
XYZ	3	0	2	0	4.0
PQR	3	0	2	4	5.0
LMN	3	2	0	4	5.0
HIJ	0	0	4	0	2

L ó Lecture, T ó Tutorial, P ó Practical, S ó Self-Study

## 8. COURSE LOAD IN REGULAR SEMESTER(S)

- 8.1. The Course load opted by a student can be a maximum of 26 credits per semester in an academic year.

- 8.2. In the first two semesters, the prescribed Course load per semester is fixed and as specified in the Scheme of Teaching for I/II Semester B.Tech. Withdrawal/dropping of Courses in I Semester and II Semester shall not be allowed.
- 8.3. From III semester onwards, the applicable Course load per semester may vary from a minimum of 18 credits to a maximum of 26 credits. The variation in credits depends on CGPA. This flexibility enables students to cope-up with the Course work and helps in improving their academic performance and to optimize the learning outcome.
- 8.4. A student may be permitted to register for additional Courses (limiting to 26 Credits), from III semester onwards. This is subject to the following conditions:
  - a) The student shall have secured a CGPA  $\times 8.5$
  - b) The student shall not have more than two backlogs from the previous semesters.
  - c) The student shall ensure that there is no overlapping in time table.
  - d) The student shall submit a copy of documentary evidence in respect to the above (a, b, c) while seeking approval from the concerned Chairperson of the Department.
  - e) It is the responsibility of the student to ensure all the above conditions (a, b, c and d) are met for registering additional Courses over and above the prescribed credits in a semester. Otherwise, the registrations for the additional Courses shall deemed to be cancelled.

## **8.5 Degree Requirements**

The Degree requirement of a student for the B.Tech. programme are as follows:

- 1. College requirements:
  - i) Minimum Earned Credit Requirement for Degree (Table 5)
  - ii) Satisfactory completion of all Mandatory Learning courses
- 2. Programme Requirements:
 

Minimum Earned Credit Requirements on all core courses, professional elective courses, open electives and major/minor project as specified. No extra credits earned on core/elective courses can be allowed in lieu of credits earmarked for major/minor project.

## **8.6 Graduation Requirements and convocation**

- 1. A student shall be declared to be eligible for the award of the degree if he/she has
  - i) Fulfilled Degree Requirements.
  - ii) No Dues to the College, Departments, Hostels, Library, Central Computer Centre and any other centres of the institution.
  - iii) No disciplinary action pending against him/her.
- 2. The award of the degree must be recommended by the University.

- 8.7. The total number of credits required to be earned by a student to qualify for the award of the Degree in Engineering (both regular and lateral entry) is shown in Table 5.

**Table 5: Credits required for the award of degree**

<b>Programme</b>	<b>Normal Duration</b>		<b>Total number of credits to be earned</b>
	<b>Years</b>	<b>Semester</b>	
B.Tech.	4	8	175
B.Tech. Lateral Entry: Regular & Evening College	3	6	142

- 8.8. A student will be awarded B.Tech. (Honours) if he / she completes an additional 20 credits. These shall be acquired through Massive Open Online Courses (MOOC), not already credited, and with the approval of the Department.
- 8.9. B.Tech. Degree once awarded, shall not be upgraded to B.Tech. (Honours), under any circumstances.

## **9. COURSE LOAD IN FAST TRACK SEMESTER**

The Fast Track Semester is helpful for students who have failed in their Examinations. The significance of Fast Track Semester is to avoid loss of an academic year to the student. It is the discretion of the Department or College to offer the Fast Track Semester. The Fast Track Semester is a Special Semester and the student shall not demand it as a matter of right.

During the Fast Track Semester, a student is permitted to Re-Register for Course(s) where he / she has secured F-Grade. No new Courses are allowed for Registration. A student is permitted to register for a maximum of 9 Credits in a Fast Track Semester (excluding credits due to Self-Study component, as the marks earned in the Self-Study component in the Regular Semester is carried forward in the Fast Track Semester).

The Department/College may offer Courses based on the availability of resources. The student has to opt from those Courses offered by the Department in a given Fast Track Semester. Students have to re-register for courses in the regular semester when offered, if not offered in the Fast Track Semester. The student has to pay a special fee prescribed by the College to register for a Course in the Fast Track Semester.

## **10. CURRICULUM FRAMEWORK**

- 10.1. Contact Hours: The maximum number of contact hours for the students is set at 35 Hrs/Week. This helps the students in getting enough time and opportunity to develop their creative talents and abilities, benefitting from add-on Courses and also those opted for audit Courses, in addition to the ones prescribed for credit under a Programme and preparing them for challenging and exciting careers.
- 10.2. Curriculum framework is important in setting the right direction for a Degree Programme, as it takes into account the type and quantum of knowledge necessary to be acquired by a student to qualify for award of a Degree in his/her chosen branch.

10.3. Besides, this also helps in assigning the credits for each Course, sequencing the Courses semester-wise and finally arriving at the total number of Courses to be studied and the total number of credits to be earned by a student to fulfil the requirements for conferring the B.Tech. Degree.

10.4. Table 6 shows a typical Curriculum framework for B.Tech. Degree Programme. The average number of credits are only indicative.

**Table 6: Curriculum Framework for B.Tech.**

Sl. No.	Subject Area And code	Average No. of Credits
1	Humanities and Social Science including Management Courses -(HS)	09
2	Basic Science Courses (Physics, Chemistry and Mathematics) -(BS)	21
3	Engineering Science Courses including Workshop, Engineering Graphics and Design, Basics of Electrical / Electronics / Mechanical / Computer / Civil, Problem Solving etc. -(ES)	22
4	Professional Core Courses -(PC)	80
5	Professional Elective Courses relevant to chosen Specialization/ Branch -(PE)	18
6	Open Elective Courses on interdisciplinary and / or emerging subjects across Departments -(OE)	06
7	Project work, seminar and internship in industry or elsewhere -(PW)	15
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Kannada] -(MC)	04
Total		175

10.4.1 Professional Core Courses (PC): They constitute the core of the programme of study and are mandatory for a given programme.

10.4.2 Elective Courses (EC): They offer a choice of advanced or specialized courses related to the programme of study. They enable students to specialize in a domain of their interest or tune their learning to suit their career needs and current trends. An Elective Course can be any of the following:

Professional Elective Courses (PE), and

Open Elective Courses (OE)

10.4.3 Professional Elective Courses (PE): They are programme-specific courses offered by the parent department listed under PE category to students of the given Programme.

10.4.4 Open Elective Courses (OE): They are offered by any department and are courses listed in the Curriculum Framework under the Open Elective category and are offered to students of any department including the parent department. The students of a particular programme have to complete the total credits required under the elective category by earning the minimum credits prescribed under the Professional Elective Courses (PE) and Open

Elective Courses (OE) as given in Table 6. There shall not be any prerequisite for open elective courses.

## **11. MANDATORY COURSES FOR B.Tech. PROGRAMME**

The UG Degree Programmes require the inclusion of certain Courses like induction programme proficiency in Kannada, Constitution of India, Environmental Science, Bridge Courses and additional Courses suggested by respective BOS for the completion of the Programme as Mandatory Courses. Mandatory Courses shall carry credits.

### **11.1Mandatory Courses for the Students admitted under lateral entry**

- i. The student shall compulsorily pass two Bridge Courses in Mathematics (one in III Semester and one in IV Semester) and Professional English, of 3 credits each.
- ii. The student shall pass the Bridge Courses in Mathematics and Professional English before the completion of the Degree Programme.

## **12. ASSESSMENT**

The CBCS consists of the following Assessment Rules:

### **12.1 Performance evaluation**

12.1.1 The assessment of student's performance during and /or at the conclusion of an academic semester has to be done using Examinations. In general, Examination may have different goals like understanding a concept, problem solving, creativity testing and endurance testing.

12.1.2 Typically, these goals can be tested by two methods:

- a) Continuous Internal Evaluation (CIE): CIE shall be conducted by the Faculty in-charge of the course throughout the semester. The CIE includes, but not limited to, Home-Works/Assignments, Group Discussions, Quizzes, Class Room Problem Solving, Seminars, Mini-Projects, Tests and Alternative Assessment Tool (AAT). These activities are designed in such a way that the Faculty and the concerned proctor will understand the shortcomings of the student that can be corrected during the interaction between the student and proctor.
- b) Semester End Examinations (SEE): SEE shall be conducted at the end of each semester to evaluate the performance of the student covering the entire syllabus of the Course. The dates are fixed by the College/University and includes a written Examination for Theory Courses and Practical/Design Examination for the Laboratory/Design Course and Project work examination.

- c) CIE and SEE shall have equal (50:50) weightage. Students performance in a Course shall be decided by taking into account the performance in CIE and SEE individually and taken together.

## 12.2 Question Papers

12.2.1 It is necessary for the Course Syllabus to be well drafted, be defect-free and be modularized to enable the setting of good question papers covering the whole syllabus, and in compliance with Outcome Based Education (OBE) including action verbs of Blooms Taxonomy. These aspects have to be addressed by the Board of Studies (BoS).

12.2.2 Question Paper Planning: Question paper should cover the entire syllabus, with a provision for the students to compulsorily answer questions from the full syllabus. As the students need to be given choice in the questions, it is preferred for the question paper at SEE, in particular, to have built-in choice. The Board of Examiners (BoE) shall take note of choice in paper setting, while planning for the question papers.

12.2.3 Question Paper Pattern: For an effective evaluation of a student in a Course, balanced question paper needs to be used as the principle tool. This makes it necessary for the question papers, used at CIE and SEE, to be in conformity with Outcome Based Education to:

- cover all sections of the course syllabus uniformly.
- be unambiguous and free from any defects/errors,
- contain adequate data/other information on the problems assigned.
- have clear and complete instructions to the candidates,
- emphasize knowledge testing, design, problem solving and qualitative analysis.

12.2.4 Typical Question Paper: The questions to be included in the question papers at CIE and SEE can be of two types:

- (i) Multiple Choice Questions, having each question to be answered by marking the correct answer/s from the choices (commonly four) given against it; such a question paper should be useful in testing the knowledge, analysis, evaluation, skills, application, and the depth of understanding of the students; However, the marks for MCQs/ short answer questions in question papers for SEE shall not exceed 15 % of the maximum marks.
- (ii) Comprehensive questions have to be answered in detail. These questions are useful in testing the depth of understanding of the subject. These questions shall be related to Theoretical / Practical Knowledge, Problem Solving, Derivations, Applications and Quantitative Evaluation at all levels.

The faculty and the External Examiners may have to be well trained to set the question papers in accordance with Clause 12.2.1.

### **12.3 Examinations / Assessment**

12.3.1 Continuous Internal Evaluation (CIE): The CIE shall be conducted by the Course Faculty. It is the responsibility of the faculty handling a Course to state the Teaching/Assessment pattern of the CIE such as Test, Quiz, Assignment, Seminar, Term Paper, Open Ended Experiments, Mini Projects, Two Minute Videos, Massive Open Online Courses (MOOCs) etc. The necessary *Rubrics* be provided to students in advance. The Faculty shall maintain transparency and announce the CIE results on time.

12.3.2 Components in a Course: Each Course consists of three components namely, Theory (Lecture and Tutorial), Practical and Self-Study. A given Course shall be classified based on the combination of one or more of these components.

12.3.3 Types of Courses: Regular/Normal, Integrated and Comprehensive.

- (i) Regular/Normal Course: Course that has only one component, i.e., Theory or Practical.
- (ii) Integrated Course: Course that has both Theory and Practical components.
- (iii) Comprehensive Course: Course that has all the three components, i.e., Theory, Practical and Self-Study. Self-Study component refers to studying of advanced topics relevant to the course, proposed by the concerned faculty, by the students.

12.3.4 Alternative Assessment: In order to encourage innovative methods while delivering a Course, the faculty members are encouraged to use Alternative Assessment Tool (AAT). The AAT enables faculty to employ innovative methods and design his/her own assessment patterns during CIE. However, the usage of AAT is optional. The AAT enhances the autonomy (freedom and flexibility) of individual faculty and enables them to create innovative pedagogical practices. If properly applied, the AAT converts the classroom into an effective learning space. The AAT includes Seminar, Assignments, Term Paper, Open Ended Experiments, Mini-Projects, Two Minute Videos, MOOCs etc. However, it is mandated for a faculty to obtain prior permission from the concerned Chairperson for implementing AAT and announce the same in the respective class before the commencement of a Course.

### **12.3.5 Assessment pattern with 20% weightage for Quiz/AAT.**

12.3.5.1 Assessment pattern for Regular/Normal Courses: The weightage of various components of CIE for Regular/Normal Courses considering weight age of 20% to Quiz/AAT i.e., 10 out of 50 marks is shown in the Table 7. SEE shall be conducted for 100 marks and the marks obtained shall be reduced for 50 marks.

**Table 7: Assessment Pattern for Regular/Normal Courses**

**(i) Theory**

<b>Component</b>	<b>Theory</b>		<b>Total Marks</b>	<b>Total marks for awarding Letter Grade</b>
Type of Assessment	Test*	Quiz# or AAT	50	100
Max. CIE Marks	40	10		
Max. SEE Marks	----	---		

**(ii) Practical**

<b>Component</b>	<b>Practical</b>			<b>Total Marks</b>	<b>Total marks for awarding Letter Grade</b>
Type of Assessment	Records and Performance	Lab Test	Viva Voce /AAT	50	100
Max. CIE Marks	20	20	10		
Max. SEE Marks	----	----	----		

**Note:**

\*There shall be two tests for theory courses and the sum of two tests shall be considered for the final assessment. The third test may be conducted for the students who are absent in any one of the tests for valid reasons. The third test may also be conducted for other students in consultation with concerned Faculty and the Chairperson of the respective Department. There shall be only one test for Practical courses to award CIE marks.

#Two Quizzes shall be conducted and sum of two Quizzes shall be considered for final assessment.

If AAT is employed, the concerned teacher shall prescribe the pattern of assessment prior to the commencement of the classes.

\*\*SEE shall be conducted for 100 marks each for theory and practical courses and the marks obtained in each case shall be reduced for 50 Marks.

12.3.5.2 Assessment pattern for Integrated Courses: The weightage of various components of CIE for Integrated Courses considering weightage of 20% to Quiz/AAT i.e., 10 out of 50 Marks is shown in the Table 8.

**Table 8: Assessment pattern for Integrated Courses**

Component	Theory		Practical			Total Marks	Total marks for awarding Letter Grade
Types of Assessment	Test*	Quiz#/A AT	Records and Performance	Lab Test	Viva Voce/AAT	100	200
Max. CIE Marks	40	10	20	20	10		
Max. SEE Marks	100**		100**			100	

Note:

\* There shall be two tests for theory component of Integrated Courses and the sum of two tests shall be considered for final assessment. The third test may be conducted for the students who are absent in any one of the tests for valid reason. The third test may also be conducted for other students in consultation with concerned Faculty and the Chairperson of the respective Department. There shall be only one test for Practical component of Integrated Courses to award CIE marks.

\*\*SEE shall be conducted for 100 marks each for theory and practical components and the marks obtained in each case shall be reduced for 50 Marks.

#Two Quizzes shall be conducted and the sum of two Quizzes will be considered for final assessment.

If AAT is employed, the concerned teacher shall prescribe the pattern of assessment prior to the commencement of the classes.

12.3.5.3 Assessment pattern for Comprehensive Courses: The weightage of various components of CIE for Comprehensive Courses considering weightage of 20% to Quiz/AAT i.e., 10 out of 50 Marks is shown in the Table 9.

SEE shall be conducted for 100 marks each for theory and practical courses and the marks obtained in each case shall be reduced for 50 Marks.

**Table 9: Assessment pattern for Comprehensive Courses**

Component	Theory		Practical			Self Study	Total Marks	Total marks for awarding Letter Grade
Types of Assessment	Test*	Quiz#/AAT	Records and Performance	Lab Test	Viva Voce/AAT	AAT	100	200
Max. CIE Marks	40	10	20	10	10	10		
Max. SEE Marks	100**		100**				100	

**Note:**

\* There shall be two tests for theory component of Comprehensive Courses and the sum of two tests shall be considered for final assessment. The third test may be conducted for the students who are absent in any one of the tests for valid reasons. The third test may also be conducted for other students in consultation with Faculty and the Chairperson of the respective Department. There shall be only one test for Practical component of Comprehensive Courses to award CIE marks.

#Two Quizzes shall be conducted and the sum of two Quizzes shall be considered for final assessment.

As AAT is employed, the concerned teacher shall prescribe the pattern of assessment prior to the commencement of the classes.

\*\*SEE shall be conducted for 100 marks each for theory and practical components and the marks obtained in each case shall be reduced for 50 Marks.

#### 12.3.6. Assessment pattern between 20 % and 40 % weightage for Quiz/AAT.

CIE assessment pattern using AAT with more than 20% weightage, but limited to 40%

A Faculty, who wishes to design AAT with more than 20% weightage, shall create a new pattern for assessment indicating weightages for all the three components. The assessment pattern shown above (12.3.5, 12.3.5.2 and 12.3.5.3) need not be used. It is mandated that a faculty shall submit a detailed assessment pattern and obtained prior approval (preferably one week before the commencement of classes), from the concerned Departmental Academic Committee (DAC) constituted for the purpose.

#### 12.4 Semester End Examination (SEE)

The SEE shall be conducted by the Institution. The Internal / External Examiners, appointed by the respective Board of Examinations, are associated with the work of Question Paper Setting/Evaluation/Moderation/Lab Examination /Project Evaluation and others.

- 12.4.1 SEE Answer scripts: The answer scripts of SEE are evaluated/ moderated by the Course Faculty / External Examiner. A committee of the College may oversee and ensure the quality and standard of evaluation and of the grades awarded in all the cases.
- 12.4.2 External Review of SEE: An external review of question papers set shall be done by the Board of Examiners (BOE) of the College by having panel of subject experts from outside the College. To achieve totality in the review of SEE operation, 30% of answer scripts shall be reviewed and then Results / Grades shall be declared. This facilitates in enhancing the confidence level on transparency and fairness of the evaluation system.
- 12.4.3 There shall be a provision for providing photocopy of the answer books for a prescribed fee.

## **12.5 Passing Standards**

The absolute linear grading method is employed for the determination of passing standards. The minimum marks for passing in respect of CIE and SEE for each Course is shown in Table 10.

**Table 10: Passing Marks using Absolute Linear Grading**

Evaluation Method	Passing Marks for Registered course
CIE	× 40%
SEE	× 40%

In case of integrated and comprehensive courses, a student must secure a minimum of 40 % marks and 75 % attendance in both theory and practical components. In addition, the overall CIE marks including theory, practical and self study components shall not be less than 40 %.

## **12.6 Project work Evaluation**

The evaluation of CIE of the project work shall be based on the progress of the student in the work assigned by the Project Supervisor, periodically evaluated by the Project Supervisor together with a Project Evaluation Committee (PEC) at the Department, constituted for this purpose. PEC ensures a minimum of three evaluations for CIE: one initial, one mid ó semester and one towards the end of semester (before the last working day). Project Demonstration/Presentation, Seminar, Submission of Project Report and Final Oral Examination shall be conducted by a panel of an Internal and External Examiner appointed by the respective BoE.

## **12.7 Electives**

- i. A candidate shall register for electives in each semester from 2 or 3 groups of electives, commencing from V semester. A minimum of 3 electives will be listed in each group and not more than one to be chosen from each group.
- ii. The minimum number of students to be registered for any Elective offered shall not be less than ten.

- iii. A candidate shall opt for his/her choice of electives and register for the same at the beginning of each of V, VI, VII and VIII semesters. The candidate is permitted to opt for change of elective within 15 days from the date of commencement of the semester as per the academic calendar.

## **12.8 There shall be NO RE-EXAMINATION for any Course in the credit system.**

### **Students who have:**

- a) absented themselves from attending CIE or SEE; without valid reasons; or,
- b) failed (Grade F, as covered in Section 14) to meet the minimum passing standards prescribed for CIE and/or SEE; or,
- c) been detained for want of attendance; or,
- d) withdrawn (Grade W, as covered in Section 13) from a Course;

shall be required to Re-Register for the Course(s) and go through CIE and SEE again and obtain a Grade equal to or better than E (refer Section 14) in each case. While such students shall have to Re-Register for the same Course(s) if Professional Core Courses, they can Re-Register for alternative Course(s) from among the Professional Elective Courses / Open Electives, as the case may be. The Re-Registration shall be possible when a particular Course is offered in regular semesters.

## **12.9 Successive Failures**

A student who has not been able to obtain eligibility for third semester even after three academic years can re-join B.Tech. Programme in the College as a fresh student to the First Year.

## **13 ATTENDANCE REQUIREMENT**

- 13.1 All students shall maintain a minimum attendance of 75% in each Course registered.

Any student failing to meet the above standard of attendance in any Course(s) registered shall not be allowed to appear for SEE of such Course(s).

- 13.2 Attendance at CIE and SEE: Attendance at all examinations, both CIE and SEE of each Course registered shall be compulsory for the students and there shall not be any provision for Re-examination.

- 13.3 Student against whom disciplinary action by the College is pending may not be permitted to attend SEE in that Semester.

- 13.4 The basis for the computation of the attendance shall be the period prescribed by the College by its calendar of events. For the first semester students, the same is reckoned from the Date of Admission to the Course.

- 13.5 The students shall take note of his/her attendance status periodically from the respective faculty and strive to make up the shortage. The Departments shall periodically

announce the attendance status of the students. Non-receipt of such information from the College shall not be considered as valid reason for exemption from the attendance requirements.

13.6 If a student does not full-fulfill the attendance requirements in any Course, then he / she shall not be permitted to attend the Semester End Examination (SEE) in that Course and is deemed to have been declared ‘U’ (Unsatisfactory) in that Course.

13.7 In respect of Integrated Courses 75% of attendance shall be maintained in theory as well as in practical component of the Course. If he / she fails to maintain the 75 % attendance in any one component, the student shall not be permitted to take up SEE in that Course.

13.8 Exemption in attendance shall be given only to a student if he/she represents, with prior permission, the University/Institution at the State level / National level / International level technical/cultural/sports events.

## **14 GRADING**

### **14.1 General**

14.1.1 The grading system has replaced the evaluation of student's performance in a Course based on absolute marks. This is to ensure uniformity in the grading practice at different autonomous Colleges to facilitate the migration of students or transfer of credits among Autonomous Colleges under the Universities.

14.1.2 Letter Grades: The letter grade is basically a qualitative measure (an alphabet/letter) to assess the performance of a student by awarding the following Grades:

- (i) Outstanding (S)
- (ii) Excellent (A)
- (iii) Very Good (B)
- (iv) Good (C)
- (v) Average (D)
- (vi) Pass (E)
- (vii) Fail (F)

The Grades are based on the absolute marks (as in conventional practice) obtained by the student. This is usually arrived at after the student's performance is assessed in a Course that includes both CIE and SEE. To begin with, absolute marks for the total are awarded, followed by grouping of all the students in a Course under different grading levels, as in Table 13.

14.1.3 Absolute Grading: The College / University have adopted the absolute grading system.

## 14.2 Grade Points

14.2.1 The College follows the 10-point grading system, as shown in Table 11.

**Table 11: Grade Points Scale (Absolute Grading)**

Level	Outstanding	Excellent	Very Good	Good	Average	Pass	Fail
Grade	S	A	B	C	D	E	F
Grade Points	10	09	08	07	05	04	00
Marks Range (%)	× 90	× 75 - < 90	× 60 - < 75	× 50 - < 60	× 45 - < 50	× 40 - < 45	< 40

14.2.2 The grade points given in Table 11 help in the computation of credit points earned by the student in a Course. The credit points are equal to the number of credits assigned to the Course multiplied by the grade points awarded to the student in that Course. This shall be used in arriving at the credit index of the student for that semester. The credit index is the sum total of all the credit points earned by the student for all the Courses registered in that semester.

14.2.3 Earning of the Credits: A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade (S, A, B, C, D, E). Letter grade F in any Course implies failure of the student in that Course and with no credits earned.

14.2.4 Transitional Grades: The transitional grades, such as  $\text{I}\ddot{\text{o}}$ ,  $\text{W}\ddot{\text{o}}$ ,  $\text{X}\ddot{\text{o}}$  shall be awarded to a student in the following cases. These transitional grades shall be converted into any one of the letter grades (S to F) after the student completes his/her Course requirements, including the Examination.

14.2.4.1 Grade  $\text{I}\ddot{\text{o}}$ : Grade  $\text{I}\ddot{\text{o}}$  is awarded to a student having satisfactory attendance at classes and meeting the passing standard at CIE in a Course, but has had remained absent from SEE for valid and convincing reasons acceptable to the College, under the following circumstances:

- a) Accident or severe illness leading to hospitalization that disables the student from attending Semester End Examination (SEE).
- b) A calamity in the family at the time of SEE that requires the student to be away from the College.
- c) In the event of (a) or (b) above, it is the responsibility of the Student/Parent/Guardian to inform the College authorities (Proctor/Chairperson/Principal) immediately. The information shall be in the form of either written communication, personal communication by parent/guardian/peer or any electronic messages. The candidate needs to submit all the relevant evidences (hospital reports, police reports, certificates from competent authorities, etc.,).

14.2.4.2 Grade -X or Grade -XØ is awarded to a student having attendance  $\times$ 75% and CIE marks  $\times$  60% in a Course, but SEE performance observed to be poor, that could result in an overall -FØ Grade in the Course. In this case -FØ grade is not awarded but student's performance record is maintained separately. The student shall be provided an opportunity in the Make-up Examination; however, the grades obtained in the Make-up Examination (D, C, B, A, S) shall be reduced to the next lower grade and grade -EØ shall remain unchanged.

14.2.5 Grade -W or Grade -WØ is awarded to a student having satisfactory attendance and has withdrawn from that Course before the prescribed date in a semester on the request of the students and the recommendation of the faculty. The student shall re-register for the said Course in the regular semesters only. All the -WØ grades awarded to the students shall be eligible for conversion to the appropriate letter grades only after the concerned students re-register for these Courses in regular semesters (Odd / Even) only and fulfil the passing standards. The students who have been awarded grade -WØ are not eligible to register for a course in the Fast Track Semester.

14.2.6 Grade -Au or A student is awarded grade -AuØ in a course if the student has registered for that course for audit only, provided that the student satisfies the attendance requirements as stipulated in Section 13. This grade would carry no grade points and is not used in the computation of SGPA or CGPA.

14.2.7 Grade Card: Each student shall be issued a Grade Card at the end of each semester. This shall have a list of all Courses registered by a student in the semester along with the credits. In addition to the letter grades with grade points, the grade card shall contain transitional grades 'T', -WØ and 'X' that does not carry any grade points. Hence, only the Courses registered for credit and having grade points shall be included in the computation of SGPA and CGPA. The grade card of a semester shall contain the total credits earned till that semester.

14.2.7.1 However, the Courses taken for audit shall not form part of this computation. The results of Mandatory Courses that are of the non-credit type shall also be reflected in the Grade Card as 'PP' (for Passed) or 'NP' (for Not Passed). It may be noted that every student shall have to obtain the grade 'PP' in each Mandatory non Credit Course to qualify for award of the Degree by the University.

14.2.8 Make-up Examination: The Make-up Examination facility shall be available to students who have missed the SEE of one or more Courses in a semester for valid reasons and have obtained the grade 'T'. Students having the 'X' grade shall also be eligible to take advantage of this facility. The standard of the Make-up Examination shall be the same as that of regular SEE for the Courses. The

Make-up Examination shall be held as per dates notified in the Academic Calendar.

- 14.2.9 In the event, a student fails in a Laboratory Course/Project and/or CIE of a course in the final year, the student shall be given grade 'T' for the Course(s). In such a case, the Institution may grant the student extra time not exceeding 12 weeks for completing the Course with due concurrence of the faculty and Chairperson of the Department. If no such extra time is sought/granted, the concerned student shall have to re-register for the Course(s) in the succeeding regular semester and fulfil the academic requirements for award of the Degree.
- 14.2.10 All the transitional grades ('T' and 'X') awarded to a student shall have to be converted to an appropriate letter grade after the make-up Examinations. Any outstanding 'T' and 'X' grades two days after the last scheduled Make-up Examinations shall be converted to 'F' grade automatically.

### **14.3 Grade Point Averages**

14.3.1 SGPA and CGPA: The credit index is used for computing the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA). SGPA is equal to the credit index for a semester divided by the total number of credits registered by the student in that semester. CGPA is the sum total of credit indices of all the previous semesters, including the current semester, divided by the total number of credits registered in all these semesters.

The SGPA and CGPA shall be computed as shown below:

#### **Semester Grade Point Average (SGPA)**

The SGPA is the ratio of sum of the product of the number of credits with the corresponding grade points scored by a student in all the courses taken by a student **to** the sum of the number of credits of all the courses undergone by the student in that semester, i.e.,

$$\hat{U} [(Course\ credits) \times (Grade\ points)]$$

(for all Courses in that semester under consideration excluding transitional grades)

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$$\hat{U} [(Course\ credits)]$$

(for all Courses in that semester under consideration excluding transitional grades)

#### **Cumulative Grade Point Average (CGPA)**

The CGPA is also calculated in the same manner as that of SGPA taking into account all the courses undergone by a student over all the completed semesters of a Programme including the current semester, i.e.,

$\hat{U} [(Course\ credits) \times (Grade\ points)]$

(for all Courses excluding those with F and transitional grades of semesters under consideration)

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$\hat{U} [(Course\ credits)]$

(for all Courses excluding those with F and transitional grades of semesters under consideration)

SGPA and CGPA facilitate the declaration of academic performance of a student, at the end of a semester and at the end of successive semesters respectively. SGPA and CGPA shall be normally calculated up to the second decimal position, so that the CGPA, in particular, can be made use of in ranking the students in a class. If two students get the same CGPA, the tie should be resolved by considering the number of times a student has obtained higher SGPA. If it is not resolved even at this stage, the number of times a student has obtained higher grades like S, A, B etc., shall be taken into account in ranking the students in a class.

14.3.2 An illustrative example given in Table 12 indicates the computation of SGPA and CGPA as in Section 14.3:

**Table 12: Typical example - Calculation of SGPA/CGPA**

Semester (Odd:I) (Even:II)	Course No.	Credits	Grade	Grade Points	Credit Points	SGPA	CGPA
I	101	1	S	10	10		
I	102	1.5	F	0	00		
I	103	3	A	9	27		
I	104	4	B	8	32		
I	105	3	W	-	-		
<b>Total</b>		9.5 (8*)			69	7.26 (69/9.5)	7.26 (69/9.5)
II	107	3	C	7	21		
II	108	4	B	8	32		
II	109	3	D	5	15		
II	110	1.5	E	4	06		
II	111	1	F	0	00		
<b>Total</b>		12.5 (11.5*)			74	5.92 (74/12.5)	6.50 (143/22)
Fast Track	102	1.5	B	8	12		
Fast Track	105	3	C	7	21		
Fast Track	111	1	D	5	5		
<b>Total</b>		5.5			38	6.91 (38/5.5)	6.58 (181/27.5)

\*Total No. of credits excluding those with 'F' and transitional grades. This is particularly important to keep track of the number of credits earned by a student up to a semester under consideration.

#### **14.4. Vertical Progression**

Minimum score for SGPA and CGPA along with the minimum number of credits are prescribed for the vertical progression of students. This facilitates the mobility of students from one College to another. The vertical progression of students is applied between two academic years only.

The following are the prescribed scores for vertical progression:

- a) Minimum Score for SGPA = 5.0
- b) Minimum Score for CGPA = 5.0 (at the end of each academic year)
- c) Maximum number of Fø Grades that can be carried at the end of any academic year is four.
- d) The maximum number of withdrawals at any given time shall not exceed two courses subject to maintaining the minimum registration requirements.

However, failure to secure a minimum CGPA = 5.0 at the end of any semester for the first time, shall attract a warning before allowing the student to continue in the next semester.

#### **14.5 Award of Class:**

The class shall be awarded after the student earn a total of 175 credits. Table 13 shows the mapping of the range of percentage marks, the range of Grade Point Average and the award of class.

**Table 13: Award of Class**

Percentage of Marks	Range of Grade Point Average (SGPA or CGPA)	Class
× 40 and < 50	5 OCGPA < 5.75	Pass Class (PC)
× 50 and < 60	× 5.75 and < 6.75	Second Class (SC)
× 60 and < 70	× 6.75 and < 7.75	First Class (FC)
× 70	× 7.75	First Class with Distinction (FCD)

Note: The percentage of marks for a given SGPA/CGPA can be computed using the formula: % Marks Scored = [CGPA ÷ 0.75] X 10

#### **14.6 Graduation Ceremony**

14.6.1 The college will organize annual Graduation Day ceremony for the award of Degrees to students completing the prescribed academic requirements.

14.6.2 The College awards Ranks and Medals to the meritorious students during the Graduation Day Ceremony to encourage the students to strive for excellence.

## **15. OTHER ACADEMIC MATTERS**

### **a. Academic Schedules**

The Academic Calendar is published before the commencement of every academic year to assist the students and faculty. The Calendar includes, dates for registration of Courses, dropping of Courses, withdrawal from Courses, etc. This enables the students to minimize their chances of failure in CIE and/or SEE and take full advantage of the flexibility provided by the CBCS.

### **b. Registration of Courses**

Each student shall have to register for Course work at the beginning of a semester as prescribed in the academic calendar. The student has to compulsorily register for all the stipulated credits in the first year of the Programme. From third semester onwards the registrations shall be within the limits of minimum ( $\times 18$ ) and maximum ( $\times 26$ ) credits. The students may seek faculty advice and discuss with the proctor/faculty prior to registration of Courses.

### **c. Dropping of Courses**

A specific period in the middle of a semester is fixed for this purpose and to help review the student's performance in CIE by the faculty advisors (proctors). The students having poor performance have the option to drop the identified Course(s) up to the minimum credits specified for the semester. The dropped courses shall not be mentioned in the Grade Card. Such Courses have to be re-registered by these students in the regular semesters at a later time. However, the students are not allowed to drop any courses in first and second semester.

### **d. Withdrawal from Courses**

A specific period is identified towards the end of a semester to help review the students' performance in CIE by the Proctor. The Proctor shall advise the students having poor performance to withdraw from identified Course(s) (up to the minimum credits specified for the semester) with a mention in the Grade Card 'W'. Such Courses have to be re-registered by these students in the main/regular semesters at a later time.

#### **(i) When to withdraw?**

A student is allowed to withdraw from a Course(s) before one week counted from the last date of the second internal test (CIE) or as mentioned in the Academic Calendar.

#### **(ii) Separate circular/notification shall not be issued in this regard. It is the responsibility of the student to withdraw from the Courses within the stipulated**

time failing which the student shall continue with the Course and fulfil the academic requirements.

**e. Temporary withdrawal from Programme**

- (i) A student may withdraw temporarily from the Programme on grounds like, prolonged illness, grave calamity in the family or any other serious circumstances. The withdrawal shall be for periods which are integral multiples of a semester, provided that:
  - (a) The student shall apply to the College within six weeks from the commencement of the semester or the date he/she last attended the classes, (whichever is later) stating fully the reasons for such a withdrawal, together with supporting documents and endorsement of his/her parent/guardian.
  - (b) The College is satisfied about the genuineness of the case and by taking into account the expected period of withdrawal, the student has the option to complete the Programme requirements within the time limits specified by the College/University.
  - (c) The student does not have any dues or demands at the College/University including tuition fee, hostel, library, laboratory and other dues.
- (ii) A student availing of temporary withdrawal from the College under the above provision shall be required to pay such fees and/or charges as may be fixed by the College until such time as his/her name appears on the Students' Roll List. However, it may be noted that the fees/charges once paid shall not be refunded under any circumstances.
- (iii) Normally, a student shall be entitled to avail the temporary withdrawal facility only once during his/her studentship of the Programme. However, any other concession, including multiple withdrawals, for the concerned student shall have to be approved by the Academic Council of the College on the recommendation of the Principal.

**f. Termination from the Programme**

A student shall be terminated from the Programme and leave the College on the following grounds:

- (i) Failure (getting F Grade) in any Course in spite of five attempts.
- (ii) Failure to secure a CGPA  $\times$  5.00 on three consecutive occasions (However, failure to secure a CGPA  $\times$  5.00 at the end of any semester for the first time

attracts warning before approval of the student to continue in the following semester).

- (iii) Absence from classes for Two consecutive semesters (Odd and Even) at a time without leave of absence being granted by competent authorities.
- (iv) Failure to meet the standards of discipline as prescribed by the College / University from time to time.
- (v) Successive Failures: A student who has not been able to obtain eligibility for third semester even after three academic years shall be terminated from the program. However, such a student can re-join the B.Tech. Programme in the College as a fresh student to the First year.

**g. Student's feedback**

- (i) The College shall obtain feedback from the students on their Course Work and various academic activities. The feedback is obtained from the students at regular intervals, as decided by the College/University, maintaining confidentiality.
- (ii) The feedback received from the students shall be reviewed by a committee constituted for the said purpose and necessary corrective measures shall be initiated.
- h. Suitable assessment tools and processes shall be incorporated for evaluation of course outcomes, program outcomes and program specific outcomes through direct and indirect methods required for accreditation of programmes by NBA.
- i. To facilitate industry interaction, a minimum of 3 guest lectures from industry, R & D organizations shall be arranged in every semester.

**16. AWARD OF PRIZES, MEDALS & RANKS**

For the award of Prizes, Medals and Ranks, the conditions stipulated by the Donor shall be considered as per the statutes framed by the College/University for such awards.

**17. CONDUCT AND DISCIPLINE**

- 17.1 Students shall conduct themselves within and outside the College campus in a manner befitting the students of an Institution of National Importance.
- 17.2 As per the order of Honourable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.

17.3 The following acts of omission/ or commission shall constitute gross violation of the Code of Conduct and are liable to invoke disciplinary measures:

- a) Ragging
- b) Lack of courtesy and decorum; indecent behaviour anywhere within or outside the campus
- c) Wilful damage or stealthy removal of any property/belongings of the College/Hostel or of fellow students/citizens.
- d) Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.
- e) Mutilation or unauthorized possession of Library books.
- f) Noisy unseemly behaviour and disturbing studies of fellow students.
- g) Hacking in computer systems (such as entering into other person's area without prior permission, manipulation and / or any other Cyber crime etc.)
- h) Plagiarism of any nature.
- i) Any other act of gross indiscipline as decided by the College/University from time to time.
- j) Use of mobile in the college academic area.
- k) Smoking in college Campus and tobacco chewing.
- l) Unauthorized fund raising and promoting sales.

Commensurate with the gravity of offence the punishment may be: reprimand, expulsion from the hostel, debarring from an examination, disallowing the use of certain facilities of the college, rustication for a specified period or even outright expulsion from the college, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.

17.4 For an offence committed in (i) hostel (ii) department or in a class room and (iii) elsewhere, the chief warden, the Head of the Department and the Dean (Academics), respectively, shall have the authority to reprimand or impose fine.

17.5 All cases involving punishment other than reprimand shall be reported to the Principal.

17.6 Cases of adoption of unfair means and/ or any malpractice in an examination shall be reported to the Registrar (Evaluation) for taking appropriate action.

## **18. INTERPRETATION**

18.1. Any question that arises as to the interpretation of these rules and regulations shall be decided by the College / University, whose decision shall be final and binding on the

student in the matter. The College / University shall also have the power to issue clarifications to remove any doubt, difficulty or anomaly, which may arise in regard to the implementation of these regulations.

- 18.2. Academic rules and regulations of CBCS may be altered/changed from time to time by the academic council of the College / University.
- 18.3. Failure to read and understand Academic rules and regulations of CBCS is not an excuse. (Ignorant juries non excusal)

**TENTATIVE CALENDAR OF EVENTS FOR THE ACADEMIC YEAR 2018-2019\***

Sl. No.	EVENT	DATE(S)
1	Arrival day, visit to the Departments and Course registration for first semester	01.08.2018
2	Inauguration of first year classes 2018-19	02.08.2018
3	Course Registration for higher semesters	03.08.2018 ó 04.08.2018
4	Induction/Orientation Programme for first year students	03.08.2018 ó 04.08.2018
5	Commencement of Classes for the Odd semester 2018-19	05.08.2018
6	Dropping of Course	On or before 19.08.2018
7	Quiz#1	To be conducted before Test#1
8	Test#1	07.09.2018 to 09.09.2018
9	Quiz#2	To be conducted before Test#2
10	Test#2	08.10.2018 to 10.10.2018
11	Last date for Withdrawal	26.10.2018
12	Test#3	16.11.2018 to 18.11.2018
13	Last working day for the ODD Semester	25.11.2018
14	SEMESTER END EXAMINATION	07.12.2018 to 19.12.2018
15	Make up Examination	04.01.2019 to 11.01.2019
16	Vacation for Students and Teachers	20.12.2018 to 07.01.2019
17	Course registration for EVEN SEMESTER	08.01.2019 ó 09.01.2019
18	Commencement of classes for the Even Semester 2018-19	11.01.2019
19	Dropping of Course	23.01.2019
20	Quiz#1	To be conducted before Test#1
21	Test#1	15.02.2019 to 17.02.2019
22	Quiz#2	To be conducted before Test#2
23	Test#2	24.03.2019 to 26.03.2019
24	Last date for Withdrawal	2.04.2019
25	Test#3	14.04.2019 to 16.04.2019
26	Last working day	21.04.2019
27	SEMESTER END EXAMINATION	02.05.2019 to 18.05.2019
28	Make up Examination	01.06.2019 to 11.06.2019
29	Vacation for students and Teachers	20.05.2019 to 30.07.2019
30	FAST TRACK SEMESTER	13.06.2019 to 30.07.2019

Note: Vacation for teachers shall be declared by College / University.

\*The calendar of events shall be announced at the start of odd semester every year for I/II Semester and III to VIII Semester, separately.

Bangalore University  
**UNIVERSITY VISVESVARAYA COLLEGE OF**  
**ENGINEERING**  
K R Circle, Bengaluru - 560 001

Scheme of Teaching and Examination for  
I Semester and II Semester B. Tech.  
(Common to all programmes except B.Arch.)

Bangalore University  
 University Visvesvaraya College of Engineering, Bengaluru  
 Scheme of Teaching and Examination for I Semester B.Tech.

**Choice Based Credit System - Physics Cycle**

Programmes: B.Tech. – 1. Electronics & Communication Engineering 2. Electrical and Electronics Engineering  
 3. Computer Science and Engineering

Sl. No.	Course Code	Title	Teaching Department	Hours/Week				Total hr/week	CIE Marks	*SEE Marks	Credits
				L	T	P	SS				
1	18BSEM101	Engineering Mathematics –I	Mathematics	2	2	0	0	4	50	50	3
2	18BSEP102	Engineering Physics - Theory	Physics	2	2	0	0	4	50	50	3
3	18BSEP103	Engineering Physics - Practical	Physics	0	0	3	0	3	50	50	1.5
4	18ESME104	Workshop &Manufacturing Practices	Mechanical	1	0	4	0	5	50**	50	3
5	18ESEE105	Basic Electrical Engineering - Theory	Electrical	2	2	0	0	4	50	50	3
6	18ESEE106	Basic Electrical Engineering- Practical	Electrical	0	0	3	0	3	50	50	1.5
7	18ESEC107	Basic Electronics	ECE	2	2	0	0	4	50	50	3
8	18HSPE108	Professional English	English	2	0	2	0	4	50	50	3
9	18MCIP109	Induction Program	College	1 week				50	--	--	1
Total				12	8	12	0	32	450	400	22
Total Marks				850							

\* SEE shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

\*\* CIE for 18ESME104 shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

Bangalore University  
 University Visvesvaraya College of Engineering, Bengaluru  
 Scheme of Teaching and Examination for II Semester B.Tech.

**Choice Based Credit System - Chemistry Cycle**

Programmes: B.Tech. – 1. Electronics & Communication Engineering 2. Electrical and Electronics Engineering  
 3. Computer Science and Engineering

Sl. No.	Course Code	Title	Teaching Department	Hours/Week				Total hr/week	CIE Marks	*SEE Marks	Credits
				L	T	P	SS				
1	18BSEM201	Engineering Mathematics -II	Mathematics	2	2	0	0	4	50	50	3
2	18BSCH110	Engineering Chemistry- Theory	Chemistry	2	2	0	0	4	50	50	3
3	18BSCH111	Engineering Chemistry - Practical	Chemistry	0	0	3	0	3	50	50	1.5
4	18ESME112	Engineering Graphics & Design	Mechanical	2	0	4	0	6	50	50	4
5	18ESCV113	Engineering Mechanics	Civil	2	2	0	0	4	50	50	3
6	18ESCS114	Programming for Problem Solving - Theory	Computer Science	2	2	0	0	4	50	50	3
7	18ESCS115	Programming for Problem Solving - Practical	Computer Science	0	0	3	0	3	50	50	1.5
8	18MCKN116	Kannada	Kannada	1	0	0	0	1	50	--	1
Total				11	8	10	0	29	400	350	20
Total Marks				750							

\* SEE shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

Bangalore University  
 University Visvesvaraya College of Engineering, Bengaluru  
 Scheme of Teaching and Examination for I Semester B.Tech.

**Choice Based Credit System-Chemistry Cycle**

Programmes: B.Tech. – 1. Civil Engineering 2.Mechanical Engineering 3. Information Science and Engineering

Sl. No.	Course Code	Title	Teaching Department	Hours/Week				Total hr/week	CIE Marks	*SEE Marks	Credits
				L	T	P	SS				
1	18BSEM101	Engineering Mathematics -I	Mathematics	2	2	0	0	4	50	50	3
2	18BSCH110	Engineering Chemistry - Theory	Chemistry	2	2	0	0	4	50	50	3
3	18BSCH111	Engineering Chemistry - Practical	Chemistry	0	0	3	0	3	50	50	1.5
4	18ESME112	Engineering Graphics & Design	Mechanical	2	0	4	0	6	50	50	4
5	18ESCV113	Engineering Mechanics	Civil	2	2	0	0	4	50	50	3
6	18ESCS114	Programming for Problem Solving - Theory	Computer Science	2	2	0	0	4	50	50	3
7	18ESCS115	Programming for Problem Solving - Practical	Computer Science	0	0	3	0	3	50	50	1.5
8	18MCKN116	Kannada	Kannada	1	0	0	0	1	50	--	1
9	18MCIP109	Induction Program	College	1 week					50	--	1
Total				12	8	10	0	30	450	350	21
Total Marks				800							

\* SEE shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

Bangalore University  
 University Visvesvaraya College of Engineering, Bengaluru  
 Scheme of Teaching and Examination for II Semester B.Tech.

**Choice Based Credit System - Physics Cycle**

Programmes: B.Tech. – 1. Civil Engineering 2. Mechanical Engineering 3. Information Science & Engineering

Sl. No.	Course Code	Title	Teaching Department	Hours/Week				Total hr/week	CIE Marks	*SEE Marks	Credits
				L	T	P	SS				
1	18BSEM201	Engineering Mathematics -II	Mathematics	2	2	0	0	4	50	50	3
2	18BSEP102	Engineering Physics - Theory	Physics	2	2	0	0	4	50	50	3
3	18BSEP103	Engineering Physics - Practical	Physics	0	0	3	0	3	50	50	1.5
4	18ESME104	Workshop & Manufacturing Practices	Mechanical	1	0	4	0	5	50**	50	3
5	18ESEE105	Basic Electrical Engineering - Theory	Electrical	2	2	0	0	4	50	50	3
6	18ESEE106	Basic Electrical Engineering - Practical	Electrical	0	0	3	0	3	50	50	1.5
7	18ESEC107	Basic Electronics	ECE	2	2	0	0	4	50	50	3
8	18HSPE108	Professional English	English	2	0	2	0	4	50	50	3
Total				11	8	12	0	31	400	400	21
Total Marks				800							

\* SEE shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

\*\* CIE for 18ESME104 shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

Bangalore University

**UNIVERSITY VISVESVARAYA COLLEGE OF  
ENGINEERING**

K R Circle, Bengaluru – 560 001

Scheme of Study and Examination of all the courses  
of I Semester and II Semester B.Tech Programmes  
(Course learning objectives, detailed syllabus and  
courses outcomes)

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF CIVIL ENGINEERING, UVCE, BENGALURU**  
**TITLE: ENGINEERING MECHANICS**

Course Code	<b>18ESCV113</b>				
Category	Engineering Science Courses				
Course title	<b>Engineering Mechanics</b>				
Scheme and Credits	No. of Hours/Week		Credits	Semester 6 I and II (cycle)	
	L	T	P	SS	
	2	2	0	0	
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3Hrs	
Prerequisites (if any): NIL					

**Course Learning Objective:**

1. The course aims in understanding the laws and principles of Engineering mechanics to field problems.
2. Basic introduction to both statics and dynamics principles will be dealt.
3. Topics on resultant and equilibrium of coplanar force system, Analysis of trusses, Friction, Centroid and Moment of Inertia of plane areas, kinetics, work and energy are dealt.
4. An understanding of the assumptions and limitations of the approaches used.
5. The ability to analyse and solve simple problems in mechanics.

**Unit I: Resultant of coplanar force system:** Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment , Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar parallel force system, Resultant of coplanar non - concurrent force system, Numerical problems. **(9 Hrs)**

**Unit II: Equilibrium of coplanar force system:** Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non - concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical Problems.

**(9 Hrs)**

**Unit III: Analysis of Trusses:** Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections, Numerical problems.

**Friction:** Theory of friction, laws of dry friction, equilibrium of block on horizontal plane, equilibrium of block on inclined plane, analysis of ladder friction, analysis of wedge friction, Numerical problems.

**(10 Hrs)**

**Unit IV: Centroid of Plane areas:** Locating the centroid of rectangle, triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical problems.

**Moment of inertia of plane areas:** Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections, Numerical problems. **(10 Hrs)**

**Unit V: Kinetics:** D'Alembert's principle of dynamic equilibrium, kinetics of curvilinear motion on horizontal plane. Banking and super elevation, Design speed, maximum speed, minimum speed, motion on level circular path and motion on banked circular path, Numerical Problems.

**Work and Energy:** Potential energy, kinetic energy, work done by a force, work-energy equation, work done by a force on spring, virtual work, principles of virtual work, Numerical problems. **(10 Hrs)**

**Text Books:**

1. Engineering Mechanics by S.S Bhavikatti, New Age International Publishers, 2004.
2. Engineering Mechanics by R.K. Bansal, Laxmi Publications, 2005.

**Reference Books:**

1. Engineering Mechanics by Ramamrutham S, UBS Publishers, 2016
2. Mechanics for Engineers by Beer and Johnston, McGraw Hill Book Company Inc, Newyork.
3. Engineering Mechanics by Timoshenko and Young, 5<sup>th</sup> Edn, McGraw India, 2013
4. Schaum's outline of Engineering Mechanics by E.Nelson, 6<sup>th</sup> Edn, McGraw Hill , US, 2011.
5. Engineering Mechanisms by Singer F. L, IIrd Edition, Harper Internatioanals ,1994.

**Scheme of Examination:**

CIE ó 50 marks	Test I (Unit I, II &III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	<ul style="list-style-type: none"> <li>• <b>Q1 (compulsory):</b> MCQs or short answer type questions for 15 marks covering entire syllabus.</li> </ul>		15 Marks	Total:100 marks
	<ul style="list-style-type: none"> <li>• <b>Q2 &amp; Q 3</b> from Unit-I and Unit-II respectively, shall be answered compulsorily and will not have internal choice.</li> </ul>		17 * 2 = 34 Marks	
	<ul style="list-style-type: none"> <li>• <b>Q4, Q5 and Q6</b> from Unit-III, Unit-IV &amp; Unit-V respectively, shall have internal choice.</li> </ul>		17*3= 51 Marks	

**Course Outcomes:**

- CO1: The concept and behaviour of forces, moments of forces on rigid bodies, Resultant of equilibrium of force system.  
 CO2: Analysis of trusses and Resistance to applied forces for different conditions  
 CO3: Properties of area of different geometrical figures and engineering sections  
 CO4: Perception of bodies under motion  
 CO5: Application of energy principles to engineering problems.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF MECHANICAL ENGINEERING, UVCE, BENGALURU**  
**TITLE: WORKSHOP AND MANUFACTURING PRACTICES**

Course Code	<b>18ESME104</b>					
Category	Engineering Science Courses					
Course title	<b>Workshop and Manufacturing Practices</b>					
Scheme and Credits	No. of Hours/Week		Credits	Semester ó I and II (cycle)		
	L	T		SS		
	1	0		0		
CIE Marks: 50**	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3Hrs		
Prerequisites (if any): NIL						

\*\*CIE shall be conducted for 100 marks and the marks obtained is to be reduced for 50 marks.

**Course Objectives:**

The objectives of course is to:

1. Impart engineering students the knowledge of different manufacturing processes employed in producing products.
2. Train the students to use basic tools used in Carpentry, Welding, Fitting, Sheet metal and Soldering.
3. Understand the working of different mechanical devices by way of demonstration of the working of basic machine tools of machine shop, steps involved in metal casting, smithy and producing plastic components.
4. Equip the students the knowledge and skill to produce simple components.

**I. Manufacturing Practices Section--- (1 Hr/Week, Max-14hrs)**

**Detailed contents: Lectures and Videos**

1. Introduction to manufacturing methods like Casting, Forming, Machining, Joining, Sheet Metal and Advanced Manufacturing Methods.
2. CNC machining, Additive manufacturing.
3. Carpentry, Fitting operations and use of power tools
4. Metal Casting , Plastic molding, Glass cutting
5. Welding (Arc welding & Gas welding), Brazing and Soldering .

**II. Workshop Practice Section: (04 hours per week of Workshop practice including demonstration and videos)**

**Detailed contents:**

1. Fitting shop
2. Carpentry
3. Welding shop
4. Sheet metal & Soldering
5. Machine Shop
6. Casting
7. Smithy
8. Plastic molding

Training and Examination shall involve the actual fabrication of simple components/models, utilizing one or more of the techniques involved in Sl No 1 to 4 of the contents and Sl No 5 to 8 of contents are for demonstration purpose only.

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

**CO1:** Upon completion of Manufacturing Practices section course, the students will gain the knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.

**CO2:** Students will be able to fabricate simple components using the tools of basic workshop.

**CO3:** They will also get practical knowledge of the dimensional accuracies possible with a few different manufacturing processes.

**CO4:** They will also get the practical knowledge to produce small components based on the skill acquired in the workshop practice.

### **Text Books:**

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 5<sup>th</sup> edition, Pearson Education India Edition, 2009.
3. R.K Rajput, "Comprehensive Workshop Practice", New edition, Laxmi Publication Pvt. Ltd, New Delhi, 2001.

### **Reference Books:**

- 1 Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology" Pearson Education, 2008.
- 2 Roy A. Lindberg, "Processes and Materials of Manufacture", 4<sup>th</sup> edition, Prentice Hall India, 1998.
- 3 Rao RN., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

### **Open Sources:**

- 1 Manufacturing Methods- <https://www.youtube.com/watch?v=JT7RcMPuDS0>
- 2 Sand Casting- <https://www.youtube.com/watch?v=M95bhPrDwA0>  
[https://www.youtube.com/watch?v=pwaXCko\\_Tkw](https://www.youtube.com/watch?v=pwaXCko_Tkw)
- 3 Extrusion-  
[https://www.youtube.com/watch?v=Y75IqksBb0M&list=PLGU2Neype87oEz\\_UgbQB1AL3B3ouxY773](https://www.youtube.com/watch?v=Y75IqksBb0M&list=PLGU2Neype87oEz_UgbQB1AL3B3ouxY773)
- 4 Rolling-  
[https://www.youtube.com/watch?v=KRn73gKQ2YU&list=PLGU2NEype87oEz\\_UGbQB1AL3B3ouxY773&index=2](https://www.youtube.com/watch?v=KRn73gKQ2YU&list=PLGU2NEype87oEz_UGbQB1AL3B3ouxY773&index=2)
- 5 Forging- <https://www.youtube.com/watch?v=XTU0Z-FkhtU>
- 6 Machining Tools-  
[https://www.youtube.com/watch?v=J63dZsw7Ia4&list=PLTtHMa9EgF9auYED8aaATZX\\_L-qtWT\\_B9V](https://www.youtube.com/watch?v=J63dZsw7Ia4&list=PLTtHMa9EgF9auYED8aaATZX_L-qtWT_B9V)
- 7 Turning- <https://www.youtube.com/watch?v=8EsAxOnzEms>
- 8 Drilling- <https://www.youtube.com/watch?v=om6GQKfoS1g>
- 9 Welding- <https://www.youtube.com/watch?v=CCzhT81GrBo>
- 10 Brazing- <https://www.youtube.com/watch?v=UL37jhKEjk>

- 11 Soldering- <https://www.youtube.com/watch?v=BLfXXRfRIzY>
- 12 Fasteners- <https://www.youtube.com/watch?v=R3w2XWOwYS8>
- 13 EDM-  
<https://www.youtube.com/watch?v=L1D5DLWWMp8&list=PL5xUm4VtvstwmPGNIIrNC3mB0YwsbJa37>
- 14 Thermal & Abrasive Water jet Cutting  
[https://www.youtube.com/watch?v=NOiXh80\\_jXU&list=PL5xUm4VtvstwmPGNIIrNC3mB0YwsbJa37&index=2](https://www.youtube.com/watch?v=NOiXh80_jXU&list=PL5xUm4VtvstwmPGNIIrNC3mB0YwsbJa37&index=2)
- 15 future Manufacturing- <https://www.youtube.com/watch?v=KyWuHcvyqD0>
- 16 CNC Machining- <https://www.youtube.com/watch?v=QTi7dnwYTVw>  
<https://www.youtube.com/watch?v=MVYb1u1xbqk>
- 17 additive manufacturing- <https://www.youtube.com/watch?v=2talsoMagAk>
- 18 fitting operations- [https://www.youtube.com/watch?v=A9m\\_3onoVV8](https://www.youtube.com/watch?v=A9m_3onoVV8)
- 19 Electrical & Electronics
- 20 Carpentry- <https://www.youtube.com/watch?v=YVXnL3LECpc>
- 21 Plastic injection moulding- <https://www.youtube.com/watch?v=b1U9W4iNDiQ>
- 22 Glass cut- <https://www.youtube.com/watch?v=gfmRLTxVFmg>
- 23 Arc welding- [https://www.youtube.com/watch?v=DIf\\_l8l5BkY](https://www.youtube.com/watch?v=DIf_l8l5BkY)  
<https://www.youtube.com/watch?v=TeBX6cKKHWY>
- 24 Gas Welding- <https://www.youtube.com/watch?v=6o6XWWbWvIU>
- 25 Brazing- <https://www.youtube.com/watch?v=m678-clpbjw>

### **Scheme of Evaluation and Examination**

#### **1. Scheme of Evaluation for CIE:**

##### **(a) Workshop Practice: Max Marks = 50**

- |       |  |                 |
|-------|--|-----------------|
| (i)   | Fitting and welding models: 10 +5 Marks =      | 15 Marks        |
| (ii)  | Carpentry and Sheet Metal: 10+ 5 marks =       | 15 Marks        |
|       | (2 models to be made in each workshop section) |                 |
| (iii) | Manufacturing Practices Section Quiz =         | 5 Marks         |
|       | Test =   | 15 Marks        |
|       | <b>Total =</b>                                 | <b>50 Marks</b> |

##### **(b) Manufacturing Practices: Max Marks = 50**

- |       |                    |
|-------|--------------------|
| (i)   | Quiz-I = 05 Marks  |
| (ii)  | Test óI = 20 Marks |
| (iii) | Quiz-II = 05 Marks |
| (iv)  | Test-II = 20 Marks |

**Total = 50 Marks**

**Note:** Average of CIE Marks of (a) and (b) shall be considered as CIE marks of course.

#### **2. Scheme of Evaluation for SEE: Max Marks = 100 Examination : 3 Hours**

- |       |  |            |
|-------|--|------------|
| (i)   | Major Model ( Fitting or Carpentry )   | = 50 Marks |
| (ii)  | Minor Model ( Welding or Sheet metal ) | = 30 Marks |
| (iii) | Viva Voce Examination                  | = 20 Marks |
|       | <b>Total = 100 Marks</b>               |            |

**SEE shall be conducted for 100 marks and the marks obtained shall be reduced to 50 marks.**

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF MECHANICAL ENGINEERING, UVCE, BENGALURU**  
**TITLE: ENGINEERING GRAPHICS & DESIGN**

Course Code	<b>18ESME112</b>					
Category	Engineering Science Courses					
Course title	<b>Engineering Graphics &amp; Design</b>					
Scheme and Credits	No. of Hours/Week			Credits 2      0      4      0      4	Semester 6 I and II (cycle)	
	L	T	P			
	2	0	4			
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100			Duration of SEE: 3Hrs	
Prerequisites (if any): NIL						

**Course Objectives:**

1. To expose the students to learn the basics of communication of Engineering drawings as per BIS convention.
2. To provide basic principle and various aspects of Engineering graphics and Design that involves learning of orthographic projection of various two dimensional (2D) and three dimensional (3D) geometry primitives in two dimensions.
3. To apply the basics of surface and solid geometry to view the sectional details and develop the lateral surface of solids and transition pieces.
4. To apply the principles of isometric projection and represent the objects in three dimension based on orthographic projection and vice versa.
5. To expose the students to create simple 2D and 3D objects followed by understanding of different geometric modelling approaches using a CAD software.

**UNIT I: (i) Introduction to Engineering Drawing:**

Principles of Engineering Graphics and their significance, B.I.S. conventions for Engineering Graphics, Dimensioning, Use of instruments, Simple geometrical constructions, Constructions of polygons, lettering, Concept of R.F. (Representative Fraction) in scales.

(4hrs)

**(ii) Orthographic Projections:**

Concept of Orthographic projection; Projection of points in different quadrants, emphasizing on First Angle Projection.

(4hrs)

Projection of Straight Lines: Projection of lines in simple Positions, inclined to one plane and parallel to other plane, inclined to both planes. To find true length and true inclinations, Simple practical problems.

(6hrs)

**UNIT II: Projections of Plane Surfaces:**

Projection of right regular plane surfaces: triangle, square, rectangle, pentagon, hexagon and circle (without through holes) by change of position and auxiliary plane methods.

(6hrs)

**UNIT III: Projections of Regular Solids:**

Projection of simple and right regular solids: Prisms, Pyramids, Cones and Cylinder (without through holes) by change of position and auxiliary plane methods.

(10hrs)

**UNIT IV: (i) Sections and Sectional Views of Right Regular Solids:**

Drawing the sectional orthographic views and auxiliary views (true shape of section) of geometrical solids: Prisms, Pyramids, Cone and Cylinder. (

**8hrs)**

**(ii) Development of Lateral Surfaces of Right Regular Solids:**

Development of lateral surfaces of right regular solids in simple position and truncated solids: Prisms, Pyramids, Cone and Cylinder. Development of transition pieces. (

**6hrs)**

**UNIT V: (i) Isometric Projections:** Principles of Isometric projections, Isometric Scale, Isometric Views, Conventions; Isometric projections of right regular solids viz. prisms, pyramids, cone, cylinder and their frustums and sphere and combination of any two of these solids. (

**6hrs)**

**(ii) Conversion of Views:**

Drawing orthographic views from given isometric view of simple machine parts. (

**4hrs)**

**UNIT VI: Computer Aided Drafting, Computer-Hardware and Software and for CIE (Demonstration):**

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software: AutoCAD- Hardware required, Screen Layout, Function Keys, Drawing Entity (Draw commands), Drafting Aids (Limits, Layers, Dimensioning, Object snap), Editing of Drawing (Modify commands), Symbol library(Block, Wblock, and Insert) 2D Drawings-simple machine parts, Floor plan and Building , 3D Drawing- Isometric drawings, 3D Geometric Modelling of simple machine parts.  
**(6hrs)**

**Text Books:**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2017), "Engineering Drawing", 53rd Edition, Publishing House, Anand, Gujarat.

2. K.R. Gopal Krishna (2016, Combined volume) "Engineering Drawing", Subhas Publication.

**Reference Books:**

1. Basanth Agrawal & C.M Agrawal (2012), Engineering Graphics, Tata Mc Graw Hill Publications

2. Narayana K.L. & P. Kannaiah (2008), Text Book on Engineering Drawing, Scitech Publishers

3. CAD Software Theory and User Manuals

**Course Outcomes:**

The students at the end of the course will be competent to:

**CO1:** Interpret the engineering drawings as per BIS convention.

**CO2:** Draw the different views of 2D and 3D objects in orthographic projections and solve practical problems involving distances and inclinations.

**CO3:** Visualise the sectional details of solids and determine the surface area of sheet metal required in practical applications.

**CO4:** Draw primitive geometric objects and simple machine parts in two and three dimensions.

**CO5:** Understand the capabilities of a typical CAD package for practical applications.

**Scheme of Examination :**

CIE ó 50 marks	Module 1, 2 & 3	Sheets 10 marks
		Test I 10 marks
(Module 4,& 5ó)		Sheets 10 marks
		Test II 10 marks
		Quiz on Computer Graphics ó 10 marks
SEE ó 100 marks (to be reduced to 50 marks)		<ul style="list-style-type: none"> <li>• There shall be eight full questions to be set (Unit I,III shall have one full question each. Unit II,IV,V shall have two full questions each).</li> <li>• Each full question shall be for a maximum of twenty marks.</li> <li>• The Unit II, IV and V will have an internal choice.</li> <li>• Scheme of examination: Answer any Five full questions choosing at least One full question from Unit II, IV and V and questions of Unit I and III are to be answered compulsorily.</li> </ul>

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF ELECTRICAL ENGINEERING, UVCE, BENGALURU**  
**TITLE: BASIC ELECTRICAL ENGINEERING**

Course Code	<b>18ESEE105</b>					
Category	Engineering Science Courses					
Course title	<b>Basic Electrical Engineering - Theory</b>					
Scheme and Credits	No. of Hours/Week		Credits	Semester ó I and II (cycle)		
	L	T		SS		
	2	2		0		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3Hrs		
Prerequisites (if any): NIL						

**Course Objectives:**

1. To provide fundamental concepts of Electrical Engineering in DC Circuits.
2. To provide fundamental concepts of Electrical Engineering in AC circuits.
3. To expose the students to the various AC and DC machines.
4. To familiarize equipment which are used in domestic and industrial applications.
5. To familiarize the Electrical installation components, wiring and measuring instruments.

**Unit I: DC Circuits (Compulsory question)**

Ohmøs law, KCL, KVL, Mesh & Nodal analysis, circuit parameters energy storage aspects, superposition, Theveninøs Theorem, Star-delta transformation. **(7hrs)**

**Unit II: AC Circuits**

R-L, R-C, R-L-C circuits (series & parallel) time constant, phasor representation, Response of R-L, R-C & R-L-C circuits to sinusoidal input, Resonance-series & parallel RLC circuits, Q-factor, Bandwidth, Measurement of three phase power with two wattmeter method. **(9 hrs)**

**Unit III: Transformers (Compulsory question)**

Construction & working principles of single phase transformer, EMF equation, equivalent circuit, pre-determine efficiency & auto-transformer. **(8 hrs)**

**Unit IV: AC, DC Machines**

Construction and working principle of DC motor, generator characteristics-application of DC machines, Construction & working principle of three phase induction motor, torque-slip characteristic and applications, single phase induction motor-types and applications, three phase alternator: construction & working principles. **(12 hrs)**

**Unit V: Electrical Installations and Power Conversion**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing Measuring Instruments: Types of meters for AC & DC, Dynamo meter type wattmeter, single phase energy meter & Megger. Types of Batteries, Important Characteristics of Batteries. Elementary calculations for energy consumption, Introduction to Power Electronics ó Two Transistor Analogy of SCR, SCR characteristics, Power Electronic Converters ó block diagram approach. **(10 hrs)**

**Text Books :**

- i) D.P. Kothari and I.J. Nagrath, "Basic Electrical Engineering", Tata McGraw hill, 2010.  
**(Units I to III)**
- ii) P.C. Sen, "Electrical Machines & Power Electronic", Wiley Pub.2013 (Units III to V)

**Reference Books:**

- i) D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- ii) L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- iii) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- iv) V.D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
- v) M.D. Singh, "Power Electronics", Tata McGraw Hill Publisher, 2008.

**E-BOOKS:**

- a) <http://nptel.ac.in/courses/108105053/>
- b) <https://books.google.com/books?isbn=812192405>

**ON-LINE VIDEO LECTURES:**

- a) <http://nptel.ac.in/courses/108108076/>

**Course Outcome:**

The students at the end of the course will be able to

- CO1: Understand the fundamental concepts of Electrical DC circuits.
- CO2: Understand the fundamental concepts of Electrical AC circuits.
- CO3: Usage of Transformer and equipments.
- CO4: Usage of Electrical AC machines and DC machines.
- CO5: Understanding and installation of Electrical protective devices, measuring instruments, battery storage system and Power Electronic Converters.

**Scheme of Examination:**

CIE ó 50 marks	Test I (Unit I, II & III)- 20 marks	Quiz I ó 5 marks	25 Marks	50
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	• <b>Q1 (compulsory):</b> MCQs or short answer type questions for 15 marks covering entire syllabus.	15 Marks	100	
	• <b>Q2 &amp; Q3:</b> From Unit I & Unit III respectively, shall be answered compulsorily and will not have internal choice.	17 * 2 = 34 Marks		
	• <b>Q4, Q5 and Q:</b> From Unit II , Unit IV & Unit V respectively, shall have internal choice.	17*3= 51 Marks		

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF ELECTRICAL ENGINEERING, UVCE, BENGALURU**  
**I SEM B.E (COMMON TO ALL BRANCHES EXCEPT B.ARCH.)**  
**TITLE: BASIC ELECTRICAL ENGINEERING LABORATORY**

Course Code	<b>18ESEE106</b>					
Category	Engineering Science Courses					
Course title	<b>Basic Electrical Engineering - Practical</b>					
Scheme and Credits	No. of Hours/Week			Credits Semester ó I and II (cycle)		
	L	T	P	SS		
	0	0	3	0		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3Hrs		
Prerequisites (if any): NIL						

**Course Objectives:**

1. To provide an exposure to common electrical components, their ratings and make electrical connections by wires of appropriate ratings.
2. To understand the usage of common electrical measuring instruments.
3. To understand the basic characteristics of transformers and electrical machines.
4. To understand VI characterization of electronic devices like diode, transistor (BJT) and SCR.
5. To get an exposure to the working of power electronic converters.

**List of Experiments / Demonstrations:**

1. Familiarization with passive components, function generator & oscilloscope
2. Step & frequency response of RC & RL circuits.
3. Two way / Three-way control of lamps.
4. Fluorescent lamp connections with capacitor and without capacitor.
5. Magnetization characteristics of DC shunt generator.
6. Torque speed characteristics of DC motor.
7. No-load & Short circuit test on single phase transformer & pre-determine the efficiency.
8. Torque-Slip characteristics of three phase Induction motor.
9. Diode characteristics.
10. Transistor characteristics.
11. SCR characteristics.
12. Demonstration of Power Electronics Converter.

**Laboratory outcomes:**

- CO1:** Get an exposure to common electrical components, their ratings and make electrical connections by wires of appropriate ratings.
- CO2:** Understand the usage of common electrical measuring instruments.
- CO3:** Understand the basic characteristics of transformers and electrical machines.
- CO4:** Understand VI characterization of electronic devices like diode, transistor (BJT) and SCR.
- CO5:** Get an exposure to the working of power electronic converters.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING, UVCE,**  
**BENGALURU**  
**Title: BASIC ELECTRONICS**

Course Code	<b>18ESEC107</b>				
Category	Engineering Science Courses				
Course title	<b>BASIC ELECTRONICS</b>				
Scheme and Credits	No. of Hours/Week			Credits	Semester ó I and II (cycle)
	L	T	P		
	2	2	0	0	
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100			Duration of SEE: 3 Hrs
Prerequisites (if any): NIL					

### **COURSE OBJECTIVES**

1. To impart the working principles of semiconductor devices and their applications in electronic amplifier and regulator circuits.
2. To teach the working principles of different types of oscillator circuits.
3. To introduce operational amplifiers and to teach the realization of mathematical functions using them.
4. To learn the working principles of basic communication systems.
5. To provide the understanding of basic digital circuits and principles of logic design.

### **UNIT I**

1. **Introduction to semiconductor devices:** Conductivity of a semiconductor, Fermi level in a semiconductor, Hall Effect. Introduction to Solar energy conversion, PN junction diodes, rectifiers and regulators, Zener diode characteristics, Zener regulated power supply. **6 hrs**
2. **Transistor Characteristics:** Principle, biasing, methods and stabilization, transistor as an amplifier, Common base configuration, Common emitter configuration and common collector configuration, with input and output characteristics, CE cut off region, CE saturation region, large signal, DC and small signal analysis, Current gain, operating point, biasing methods, Stabilization, decibel, Classification of power amplifiers, RC coupled amplifier and its frequency response, Transistor as switch, FET, MOSFETS, CMOS. **12 hrs**

### **UNIT II**

2. **Sinusoidal oscillators:** Concept of feedback, sinusoidal oscillators, working of RC phase shift, Colpitts and Hartley oscillators; Expressions for frequency of oscillation and condition for sustained oscillations, crystal oscillator (No derivations). **5 hrs**

### **UNIT III**

3. **Operational Amplifiers (OPAMP):** Introduction, ideal OPAMP, need for OPAMP, OPAMP characteristics, OPAMP applications: voltage follower, addition and subtraction using OPAMP circuits, OPAMP integrating and differentiating circuits. **6 hrs**

### **UNIT IV**

4. **Communication systems:** Block diagram of communication systems: Radio AM & FM, TV, Overview of Mobile communication, Satellite communication, optical communication,

Modulation, Amplitude Modulation, Frequency spectrum, power relations, Frequency Modulation super heterodyne receiver, Transmitters. **10 hrs**

## **UNIT V**

5. **Introduction to Digital Electronics:** Digital logic, binary logic symbols, basic theorems & properties of Boolean Algebra, De-Morgan's theorem. AND OR logic gate realizations using Transistor- Transistor Logic (TTL), MOS, CMOS, NMOS, PMOS. Symbols used for NOT, OR, AND, NAND, NOR, XOR gates and their truth tables, Realization of Boolean functions using basic gates. Realization of basic gates using universal gates. **9 hrs**

### **Text Books:**

1. Electronic Devices and Circuits By David A Bell, PHI, 5 edition ,2007 (UNIT I to III)
2. Electronics Communication Systems, George Kennedy (TMH 4<sup>th</sup> edition).(UNIT IV)
3. Digital Principles and Applications Albert paul Malvino, Donald P Leach, Goutamsaha, 6<sup>th</sup>ed, Tata Mcgraw Hill. (UNIT V)

### **Reference Books:**

1. Electronics Devices and Circuitsö Millman and Halkias, TMH
2. Electronic Devices and circuit TheoryRobert L Boylestad and L.Neshelsky, Pearson Education,9 edition, 2005
3. Electronics Principles A.P. Malvino, TMH 6<sup>th</sup> edition.
4. Digital Logic and Computer Design, Morris Mano.
5. Communication Systems, Simon Haykin, John wiley.

### **E – books& Online Resources**

1. <http://gk12.poly.edu/amps-cbri/pdf/Basic%20Electronics.pdf>, 2012
2. [http://www-f9.ijs.si/~gregor/ElektronikaVaje/ElectronicsLectures\\_GinGrich.pdf](http://www-f9.ijs.si/~gregor/ElektronikaVaje/ElectronicsLectures_GinGrich.pdf),

## **COURSE OUTCOMES**

After successful completion of course, students will be able to

- CO1: Analyze the working of Electronic circuits using Semiconductor Devices.  
CO2: Realize Electronic circuits using Operational Amplifiers including mathematical modelling  
CO3: Explain the working of Digital circuits and communication Systems

### **SCHEME OF EXAMINATION:**

CIE ó 50 marks	Test I (Unit I)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 marks
	Test II (Unit II, II, V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	• <b>Q1 (compulsory):</b> MCQs or short answer type questions for 15 marks covering entire syllabus.		15 Marks	Total:100 marks
	• <b>Q2 &amp; Q3</b> from Unit-I and Unit-V respectively, shall be answered compulsorily and will not have internal choice.		17 * 2 = 34 Marks	
	• <b>Q4, Q5 and Q6</b> from Unit-II, Unit-III & Unit-IV respectively, shall have internal choice.		17*3= 51 Marks	

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UVCE, BENGALURU**  
**Title: PROGRAMMING FOR PROBLEM SOLVING**

Course Code	<b>18ESCS114</b>					
Category	Engineering Science Courses					
Course title	<b>Programming for Problem Solving -Theory</b>					
Scheme and Credits	No. of Hours/Week			Credits Semester I and II (cycle)		
	L	T	P	SS		
	2	2	0	0		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3 Hrs		
Prerequisites (if any): NIL						

**Course Objectives:**

The students will be able to

1. Develop arithmetic reasoning and analytical skills to apply knowledge of basic concepts of programming to complex engineering problems
2. Learn basic principles of problem solving through programming
3. Write C programs using appropriate programming constructs

**Unit I: Introduction:** Components of computer system, Variables and Arithmetic Expressions, Symbolic Constants, Character Input and Output, Arrays, Functions, Arguments-Call by Value, Character Arrays, External Variables and Scope.

**Types, Operators, and Expressions:** Variable Names, Data Types and Sizes, Constants, Declarations, Arithmetic Operators, Relational and Logical Operators, Type Conversions, Increment and Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Conditional Expressions, Precedence and Order of Evaluation.

**Control Flow:** Statement and Blocks, If-Else, Else-If, Switch, Loops-While and For, Loops-Do-While, Break and Continue, Goto and Labels. **(8 hrs)**

**Unit II: Arrays:** One Dimensional Arrays, Declaration of One-Dimensional Arrays, Initialization of One-Dimensional Arrays, Two-Dimensional Arrays, Initializing Two-Dimensional Arrays, Multi-Dimensional Arrays, Dynamic Arrays.

Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String-handling Functions, Table of Strings.

**Basic Algorithms:** Linear Search, Binary Search, Bubble Sort, Insertion Sort and Selection Sort. Finding roots of equations, notion of order of complexity through example programs. **(10 hrs)**

**UNIT III: User-defined Functions:** User-defined Functions, A Multi-function Program, Elements of User-defined Functions, Definitions of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and No Return Values, Arguments with Return Values, No Arguments but Returns a Value, Functions that Return Multiple Values, Nesting of Functions, Recursion, Passing Arrays to Functions, Passing Strings to Function, The Scope, Visibility and Lifetime of Variables, Quick sort and Merge sort. **(8 hrs)**

**UNIT IV: Pointers:** Understanding Pointers, Accessing the Address of a Variable, Declaring and Initializing of pointers, Accessing a Variable through its Pointer, PointerExpressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers as Function Arguments, Functions Returning Pointers, Pointer to Functions.

**Dynamic Memory Allocation:** Introduction, Library functions for dynamic memory allocation, Dynamic multi-dimensional arrays, Self Referential Structures. **(10 hrs)**

**UNIT V: Structures and Unions:** Defining a Structure, Declaring Structure Variables, Accessing Structure Members,, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individual Members, Arrays of Structures, Arrays within Structures, Structures Within Structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

**File Management in C:**Defining File, Opening File, Closing a File, Input /Output Operations on Files, Error Handling During I/O Operations, Command Line Arguments. **(10 hrs)**

**Text Books:**

- (i) E. Balaguruswamy, Programming in ANSI C, 7<sup>th</sup> Edition, Tata McGraw-Hill 2017.
- (ii) K R Venugopal & R Prasad: Mastering C, 2<sup>nd</sup> Edition, McGraw-Hill, 2017..

**Reference Books:**

- (i) Richard F G and Behrouz A Forouzan, Data Structures, A pseudocode approach with C, 2<sup>nd</sup> Edition, Cengage Learning.
- (ii) Herbert Schildt, C: The Complete Reference, 4<sup>th</sup> Edition, McGraw Hill, 2003.
- (iii) Byron Gottfried, Schaum's Outline of Programming with C, 2<sup>nd</sup> Edition, McGraw-Hill.
- (iv) Yashvant Kanetkar: Let us C@ BPB publications, 10<sup>th</sup> Edition, 2010.

**e-Books/Online Resources:**

- (i) Introduction to C Programming by ROB Miles  
<http://www.control.aau.dk/~jdn/edu/doc/arduino/litt/C%20Programming.pdf>
- (ii) C Programming tutorial by Mark Burgess  
<http://markburgess.org/CTutorial/C-Tut-4.02.pdf>
- (iii) <http://www.lysator.liu.se/c/bwk-tutor.html#introduction>
- (iv) [http://www.acm.uiuc.edu/webmonkeys/book/c\\_guide/](http://www.acm.uiuc.edu/webmonkeys/book/c_guide/)

**MOOCs:**

- (i) <http://nptel.ac.in/courses/106105085/4>
- (ii) <http://www.lynba.com/C-training-tutorials/1249-0.html>
- (iii) Ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010
- (iv) [www.cse.iitb.ac.in/~CS101/2011.1/](http://www.cse.iitb.ac.in/~CS101/2011.1/)

**Course Outcomes:** The students at the end of the course, will be able to

**CO1:** Understand and explore the fundamental Computer Concepts and basic Programming Principles like data types, Operators, input/output functions, Programming constructs and user defined functions

**CO2:** Develop and analyse algorithmic solutions to problems.

**CO3:** Design and Implement C Programs in efficient, robust and reusable code.

**CO4:** Apply appropriate Concepts of data structures like arrays, structures, pointers etc., for various applications.

**CO5:** Apply programming concepts such as memory allocation/ relinquish, file handling and pointers in implementing the real world computer problems.

**Scheme of Examination:**

CIE ó 50 marks	Test I (Unit I, II &III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	<ul style="list-style-type: none"><li><b>Q1 (compulsory):</b>MCQs or short answer type questions for 15 marks covering entire syllabus.</li><li><b>Q3 &amp; Q 6</b> from Unit-II and Unit-V respectively, shall be answered compulsorily and will not have internal choice.</li><li><b>Q2, Q4and Q5</b> from Unit-I, Unit-III &amp; Unit-IV respectively, shall have internal choice.</li></ul>	<p>15 Marks</p> <p><math>17 * 2 = 34</math> Marks</p> <p><math>17*3= 51</math> Marks</p>		Total:100 marks

**Note:** SEE shall be conducted for 100 marks and the marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UVCE, BENGALURU**  
**Title: PROGRAMMING FOR PROBLEM SOLVING**

Course Code	<b>18ESCS115</b>					
Category	Engineering Science Courses					
Course title	<b>Programming for Problem Solving - Practical</b>					
Scheme and Credits	No. of Hours/Week		Credits	Semester ó I and II (cycle)		
	L	T		SS		
	0	0		3		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3 Hrs		
Prerequisites (if any): NIL						

### Course Objectives:

The students will be able to

1. Apply the specification of syntax rules for numerical constants and variables, data types.
2. Usage of Arithmetic operator, Conditional operator and relational operators and other C constructs.
3. Write C programs using decision making, branching, looping constructs.
4. Apply and Write C programs to implement one dimensional and two dimensional arrays.
5. Writing Programs using strings, structures and pointers.

### Practice Session

1. Demonstration of components of a Computer
2. Write a program to find Smallest and largest of three numbers.
3. Evaluate the following expression
  - i.  $a + b * c / d$ .
  - ii.  $(a+b*c)-d ^ a$
4. Write a program to convert Binary to Decimal and Decimal to Binary.
5. Write a Program to find sum of odd and even numbers from 1 to N.
6. Write a Program to perform string operations using library functions.
7. Write a Program to display a Pascal's triangle.

### Lab Programs

Solve the following problems using C Program.

- 1) a. Find the roots of quadratic equation.  
 b. Find the reverse of an integer and check whether it is a palindrome or not.
- 2) a. To generate and print first N Fibonacci numbers using recursion.  
 b. Find the GCD of two integers.
- 3) a. Compute mean, variance and standard deviation of N real numbers.  
 b. Search an element using linear search method.

- 4) a. Interchange the largest and smallest number in the array.  
b. Search an element using binary search method.
- 5) a. To check whether a given string is palindrome or not without library functions  
b. Find the number of vowels, consonants, digits and white spaces in a string.
- 6) a. Sort N elements of an array in ascending order using bubble sort technique.  
b. Delete an element from an array.
- 7) Input 2 matrices of size MxN and PxQ. Perform  
a. Multiplication if they are compatible.  
b. Transpose of the resultant matrix. Print the result in matrix form with suitable headings.
- 8) Read a matrix A (MxN) and to find the following.
  - i) Sum of the elements of the row
  - ii) Sum of the elements of the column.
  - iii) Sum of all the elements of the matrix.
  - iv) Sum of both diagonal elements of a matrix.Output the computed results with suitable headings.
- 9) Define a Structure called Employee with Emp ID, Emp-name and Salary as its data members.  
Read details of N Employees and display the details of employees whose salary is greater than 15000.
- 10) a. Swap the contents of two variables using pointers.  
b. Concatenate the contents of two files.
- 11) Create a structure called student with the following members student name, roll-no, marks in three tests. Write a C program to create N records and
  - i) Search on roll-no and display all the records
  - ii) Average marks in each test
  - iii) Highest in each test.
- 12) a. Store a character string in a block of memory space created by malloc( ) and then modify the same to store a large string.  
b. Reverse the elements of an array using pointers.

#### **Course Outcomes:**

The students at the end of the course, will be able to

**CO1:** Develop programs using concept of decision making statements and arrays.

**CO2:** Reduce the complexity of the programs by making use of functions.

**CO3:** Develop and experiment with programs using concepts like pointers, files, structures.

**Scheme of Examination:**

<b>Continuous Internal Evaluation (Laboratory – 50 Marks)</b>	<b>Marks</b>	<b>Semester End Evaluation(SEE) Laboratory (100 Marks)</b>	<b>Marks</b>
Performance of the student in the laboratory, every week	20	Write up	20
Test at the end of the semester	20	Execution	60
Viva voce	10	Viva voce	20
<b>Total</b>	<b>50</b>	<b>Total</b>	<b>100</b>

**Note:** SEE shall be conducted for 100 marks for practical and the marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF PHYSICS, BENGALURU**  
**Title: ENGINEERING PHYSICS**

Course Code	<b>18BSEP102</b>				
Category	Basic Sciences				
Course title	<b>Engineering Physics – Theory</b>				
Scheme and Credits	No. of Hours/Week				Semester ó I and II (cycle)
	L	T	P	SS	
CIE Marks: 50	2	2	0	0	3
SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 4 Hrs		
Prerequisites (if any): NIL					

**Course Objectives:**

1. To make students learn and understand basic concepts and principles of physics to analyse and solve various types of Physical problems.
2. To learn the theory of vibrations and to understand the concept of elasticity.
3. To understand the concept of electrical conductivity in solids and semiconductors.
4. To study the Magnetic and Dielectric properties of Solids.
5. The concept of different phenomenon in optics will be studied.

**Unit I: Physics of vibrations:** Free oscillations- differential equation and solution; Damped vibrations - differential equation and solution - critical, over and under damping, Forced vibrations - differential equation and solution, Resonance - amplitude and velocity resonance, sharpness of resonance, quality factor, example of forced vibrations - LCR circuits and resonance, problems.

**Elasticity:** Introduction - Definition of Elastic moduli and Poisson's ratio, Statement of Hook's law, Torsional Pendulum, Bending of Beam - Bending Moment, Cantilever Experiment to determine Youngøs Modulus, problems. (11 Hrs)

**Unit II: Electrical Conductivity in Solids:** Review of Classical free electron theory-Expression for electrical conductivity in metals, Density of States and Carrier Concentration in Metals. Expressions for thermal conductivity in metals, Wiedemann-Franz law, Limitations of free electron theory.

**Introduction to Semiconductors:** Intrinsic Semiconductors with examples, Fermi level in intrinsic semiconductors, Expression for energy gap in intrinsic semiconductors, Extrinsic Semiconductors, n-type and p-type semiconductors with examples, charge carrier density in extrinsic semiconductors. (7 Hrs)

**Unit III: Magnetic Materials:** Magnetism, Classification of magnetic materials and their properties, Ferrromagnetic materials ó concept of domain, B-H curve, Hysteresis loss, Hard and Soft magnetic materials - Properties and applications.

**Dielectric Materials:** Introduction, Types of polarization, Clausius -Mossotti equation, Ferroelectric Materials- Properties and applications of dielectric materials. (7 Hrs)

**Unit IV: Interference:** Principle of superposition, conditions for interference, Newton rings- condition for bright and dark rings, problems.

**Interference in Thin Films:** Theory of interference fringes, Determination of the thickness of a thin paper strip using air-wedge, problems.

**Diffraction:** Definition & condition for Diffraction, two kinds of diffraction, diffraction grating- Determination of wave lengths of mercury spectrum, problems. (12 Hrs)

**Unit V: Lasers:** Spontaneous and stimulated emission, population inversion, construction and working of Helium-Neon and semiconducting laser, applications of lasers, problems.

**Optical fibres:** Mechanism of light transmission in optical fibre, derivation of expression for numerical aperture and acceptance angle, types of optical fibres, loss mechanisms in optical fibres, applications of optical fibres, problems.

**Holography:** Fundamentals of holography, difference between photography and holography, construction of hologram, recording and reconstruction of three dimensional image, applications of holography.

(10 Hrs)

#### Text Books:

1. **R K Gaur and S L Gupta**, Engineering Physics, Dhanpat Rai Publications, Revised edition 2011.
2. **M N Avadhanulu, P G Kshirsagar**, A Text Book of Engineering Physics, S. Chand Company Private Limited. Revised Edition 2015.
3. **Ajay Ghatak**, Optics, McGraw Hill Education (India) Private Limited, 5<sup>th</sup> Edition, 2012.
4. **S P Basavaraju**, Engineering Physics, Subhas Publications, 1998 & CBCS syllabus, Subhas Publications, 2016.
5. **Srinivasan M R**, Physics for Engineers, New Age International 2009.

#### Reference Books:

1. **Halliday, Resnick & Walker**, Fundamentals of Physics, John Wiley & Sons, 2010.
2. **Hitendra K Malik and A K Singh**, Engineering physics, Tata McGraw Hill
3. Education private Limited, 2009.
4. **Sears and Zemansky**, University Physics with modern physics, 13<sup>th</sup> Edition, University Press
5. **H D Young and R A Freedman**, University Physics, 13 Edition, Pearson

#### E-Books/Online Resources:

1. M N Avadhanulu, A Textbook of Engineering Physics, S. Chand Publishing, 1992,  
[https://books.google.co.in/books?id=ITUNWOR\\_cDgC](https://books.google.co.in/books?id=ITUNWOR_cDgC)
2. Dattu R Joshi, Engineering Physics, Tata McGraw-Hill Education, 2010.  
[https://books.google.co.in/books/about/Engineering\\_Physics.html](https://books.google.co.in/books/about/Engineering_Physics.html)
3. V Rajendran, Engineering Physics, Tata McGraw-Hill Education,  
[https://books.google.co.in/books/about/Engineering\\_Physics.html?id=KsXTNUCuby0C](https://books.google.co.in/books/about/Engineering_Physics.html?id=KsXTNUCuby0C)
4. Mahesh C Jain, Engineering Physics, PHI Learning Pvt. Ltd., 2009,  
[https://books.google.co.in/books/about/Textbook\\_Of\\_Engineering\\_Physics.html?id=wKeDYbTuiPAC&redir\\_esc=y](https://books.google.co.in/books/about/Textbook_Of_Engineering_Physics.html?id=wKeDYbTuiPAC&redir_esc=y)

#### MOOCs:

1. <http://nptel.ac.in/courses/122107035/>
2. <http://nptel.ac.in/courses/122103010/> (Practicals)

#### Course Outcomes:

The students at the end of the course will be able to:

**CO1:** Understand the concept of theory of vibrations which helps to set up and solve differential equations related to the situation and the knowledge of elasticity that can be applied in different branches of Engineering.

**CO2:** The importance of free electrons in determining the properties of metals, to understand the concept of fermi energy useful in analyzing the structure of solids. The knowledge of semiconductors can be implemented in many day to day applications.

**CO3:** The mechanical properties of the materials will be understood by learning the concept of magnetic and dielectric properties using which strength of the materials can be analyzed.

**CO4:** The importance of the Physics of Optics is significant in various fields of Science and Technology.

**CO5:** Describe the basics of laser physics, their working and construction, principle of propagation in optical fibers and about holography.

**Scheme of Examination:**

CIE ó 50 marks	Test I (Unit I, II & III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	• <b>Q1 (compulsory):</b> MCQs or short answer type questions for 15 marks covering entire syllabus.		15 Marks	Total:100 marks
	• <b>Q2 &amp; Q 3</b> from Unit-II and Unit-III respectively, shall be answered compulsorily and will not have internal choice.		17 * 2 = 34 Marks	
	• <b>Q4, Q5 and Q6</b> from Unit-I, Unit-IV & Unit-V respectively, shall have internal choice.		17*3= 51 Marks	

**Note:** SEE shall be conducted for 100 marks. The marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF PHYSICS, BENGALURU**  
**Title: ENGINEERING PHYSICS**

Course Code	<b>18BSEP103</b>				
Category	Basic Sciences				
Course title	<b>Engineering Physics –Practical</b>				
Scheme and Credits	No. of Hours/Week				Semester 6 I and II (cycle)
	L	T	P	SS	
	0	0	3	0	
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE:3 Hrs	
Prerequisites (if any): NIL					

**Course Objectives:**

1. To conduct experiments for determining mechanical, material and electrical properties.
2. To conduct experiments for determining typical parameters of optics.
3. To develop skills in handling precision devices and equipments.

**List of Laboratory Experiments**

1. Study of frequency response in series and parallel LCR circuits and quality factor.
2. Determination of frequency of tuning fork using volume resonator.
3. Determination of Young's Modulus of the material using single cantilever.
4. Determination of rigidity modulus of the given wire by torsional oscillations method.
5. Determination of electrical conductivity of a semiconductor using four probe method.
6. Measurement of energy gap of a semiconductor.
7. Determination of dielectric constant of the material by charging and discharging of the capacitor.
8. Study of B-H Curve in ferrites/soft iron using CRO.
9. Measurement of wavelength of mercury spectrum using diffraction grating.
10. Measurement of radius of curvature of a lens by Newton's rings method.
11. Determination of thickness of a paper strip using air-wedge.
12. Estimation of numerical aperture and attenuation coefficient of an optical fibre.

**Note:**

1. Each student has to perform 10 experiments in a semester.
2. References under theory can be used.

**E-Books/Online Resources:**

1. Engineering Physics Lab Manual, Vishnu universal learning,  
[https://www.bkrit.ac.in/Freshman\\_Lab\\_Manuals/freshman\\_engineering\\_physics/Engineering%20Physics.pdf](https://www.bkrit.ac.in/Freshman_Lab_Manuals/freshman_engineering_physics/Engineering%20Physics.pdf)
2. Engineering Physics Lab Manual,  
<http://www.aurora.ac.in/images/pdf/departments/humanities-and-sciences/engg-phy-lab-manual.pdf>

**Course Outcomes:**

**CO1:** They will be knowing the principle behind determining experimentally the physical and electrical properties of few materials.

**CO2:** They will be knowing the principle behind determining parameters of optics in engineering

**CO3:** They will develop confidence and skills in handling equipment.

**CO4:** They will be in a position to describe the principles and theory on which the experiment is based on.

**Scheme of Examination:**

<b>Continuous Internal Evaluation (Laboratory – 50 Marks)</b>	<b>Marks</b>	<b>Semester End Evaluation(SEE) Laboratory (100 Marks)</b>	<b>Marks</b>
Performance of the student in the laboratory, every week	20	Write up	20
Test at the end of the semester	20	Experiments	60
Viva voce	10	Viva voce	20
<b>Total</b>	<b>50</b>	<b>Total</b>	<b>100</b>

**Note:** SEE shall be conducted for 100 marks for practical and the marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF CHEMISTRY, BENGALURU**  
**Title: ENGINEERING CHEMISTRY**

Course Code	<b>18BSCH110</b>				
Category	Basic Sciences				
Course title	<b>Engineering Chemistry- Theory</b>				
Scheme and Credits	No. of Hours/Week				Semester 6 I and II (cycle)
	L	T	P	SS	
	2	2	0	0	
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE:3 Hrs	
Prerequisites (if any): NIL					

### **Course Objectives:**

1. To provide basic principles and various aspects of atomic, molecular orbitals: their applications.
2. To expose the students to understand the theory and prevention of electroplating/electroless plating in various industries and to study green chemistry protocols.
3. To study the construction, uses of modern day batteries.
4. To enable the students to learn preparation and applications of polymers and conducting polymers.
5. To provide the factors and control of corrosion.

### **Unit I : Atomic and molecular structure**

Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic molecules.

Bonding in solids: Ionic, covalent, metallic and molecular solids.

Band theory of solids ó Molecular orbital theory, linear combination of atomic orbitals, bonding and antibonding orbitals with hydrogen as example. Extension of band theory to metals, semiconductors and insulators. Semiconductors- Intrinsic and extrinsic ó p and n-types, stoicheometric semiconducting compounds, numerical problems. **(9 hrs)**

### **Unit II: Metal finishing**

Technological importance. Effect of plating variables on electrodeposits. Electroplating techniques ó methods of electroplating, surface preparation, plating of Cr. Electroless plating of copper for PCB  
**(3 hrs)**

### **Organic reactions and synthesis**

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring-opening reactions. Green chemistry principles (12 principles) Atom economy: concept, AE in oxidation of benzene and butadiene. Microwave irradiation in organic synthesis: concept, advantages, synthesis of esters, oxidation reactions, amination of ketones; Bio-catalysis: Concept, advantages, synthesis of 6-aminopenicillanic acid. **6 hrs)**

### **Unit III: Use of free energy in chemical equilibria**

Thermodynamic functions: energy, entropy and free energy. Free energy and emf. Cell potentials, the Nernst equation and applications.

Battery technology: Introduction, basic concepts- Principal component of battery, classification, cell reactions and performance of primary battery ó Zn-MnO<sub>2</sub>, secondary batteries ó working principle, cell reactions and performance of Pb-acid battery, Ni-Cd battery. Fuel cells ó Definition, classification and advantages and limitations. Construction and cell reactions of H<sub>2</sub>-O<sub>2</sub> fuel cell and methanol-oxygen fuel cell. Numerical problems.

(9 hrs)

#### **Unit IV: Stereochemistry**

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry, chirality, enantiomers, diastereomers, optical activity. Conformations in cyclohexanes (disubstituted only). Structures of different molecules.

(3 hrs)

#### **Polymers**

Definitions ó Natural and synthetic polymers, mechanism of addition polymerization (free radical mechanism), ó manufacture, properties and applications of HDPE and LDPE, polystyrene, phenol-formaldehyde, Teflon, poly methyl methacrylates, polyurethanes and polycarbonates. Elastomers: Synthesis, properties and uses of elastomers (synthetic rubbers) ó Buna S and neoprene.

Conducting polymers Definition, examples-PA, PPP, PPy difference between conducting polymers and conventional conductors. Reactions of all the preparations.

(6 hrs)

#### **Unit V: Periodic properties**

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard and soft acids and bases, molecular geometries.

(4 hrs)

#### **Corrosion engineering**

Metallic corrosion- definition, electrochemical theory of corrosion. Forms of corrosion, stress corrosion. Factors affecting the rate of corrosion. Corrosion control surface coatings, inorganic coatings ó phosphating, anodizing, organic coatings ó paints and enamels. Metal coatings ó anodic metal coatings ó galvanizing. Cathodic metal coatings ó tinning. Corrosion inhibitors. Cathodic and anodic protection.

(5 hrs)

#### **Text Books**

1. Engineering Chemistry by R. Gopalan, D. Venkappayya and Nagarajan, Vikas Publishing House Pvt. Ltd. 1999.
2. Chemistry for Engineering Students by Dr. B. S. Jai Prakash, Dr. Shivakumaraiah, Prof. R. Venugopal and Dr. Pushpa Iyengar.
3. Engineering Chemistry by Jain and Jain.

#### **REFERENCE BOOKS**

4. Solid State Chemistry and its applications by A.R. West, John Wiley, 1987.
5. Chemistry in Engineering and Technology Vol.1 and Vol.2 by J. C. Kuriacose and J. Rajaram, Tata McGraw ó Hill Publishing Company Ltd.
6. Chemistry of advanced materials by C.N. R. Rao, Blackwell Scientific Publications, 1993.
7. Solid state chemistry compounds by A. K. Cheethan and P. Day, Clarendon press, Oxford, 1992.
8. An introduction to electrochemistry by Glasstone, East-West Press Pvt.Ltd., 1985
9. Chemical and electrochemical energy systems by R. Narayan and B. Viswanathan, University press, 1998.
10. Text book of polymer science by F. W. Billmeyer, Jr., John Wiley and Sons 1994.
11. Green Chemistry An Introductory Text by Mike Lancaster, Royal Society of Chemistry, 2002.
12. Green Chemistry Environment Friendly Alternatives by Rashmi Sanghi and M. M. Srivastava, Narosa Publishing House, 2003.

## Online Resources

1. <http://nptel.ac.in/>
2. [www.smartzworld.com](http://www.smartzworld.com)
3. <http://www.tndte.gov.in/>
4. <https://pubs.acs.org/doi/abs/10.1021/ie50456a005>
5. <https://www.pdfdrive.net/polymer-science-and-engineering-e397082.html>
6. <https://www.mooc-list.com/tags/mechanical-engineering>

## Course Outcome:

The students at the end of the course will be able to

**CO1:** Understand the basic principles and various aspects diatomic molecules and band theory of solids.

**CO2:** Learn the various methods of metal finishing and green chemistry reactions.

**CO3:** Acquire the knowledge of the applications of batteries.

**CO4:** Learn the preparation and applications of polymers and conducting polymers.

**CO5:** Have the chemical knowledge of the control of corrosion.

## Scheme of Examination:

CIE ó 50 marks	Test I (Unit I, II &III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	• <b>Q1 (compulsory):</b> MCQs or short answer type questions for 15 marks covering entire syllabus.		15 Marks	Total:100 marks
	• <b>Q2 &amp; Q 3</b> from Unit-II and Unit-III respectively, shall be answered compulsorily and will not have internal choice.		17 * 2 = 34 Marks	
	• <b>Q4, Q5 and Q6</b> from Unit-I, Unit-IV & Unit-V respectively, shall have internal choice.		17*3= 51 Marks	

**Note:** SEE shall be conducted for 100 marks. The marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF CHEMISTRY, BENGALURU**  
**Title: ENGINEERING CHEMISTRY**

Course Code	<b>18BSCH111</b>				
Category	Basic Sciences				
Course title	<b>Engineering Chemistry- Practical</b>				
Scheme and Credits	No. of Hours/Week			Credits	Semester I and II (cycle)
	L	T	P		
CIE Marks: 50	0	0	3	0	1.5
SEE Marks: 50	Total Max. Marks: 100		Duration of SEE:3 Hrs		
Prerequisites (if any): NIL					

### **Course Objectives**

1. To expose the students to learn the preparation of standard solutions.
2. To study the estimations of constituents in live samples like hard water, waste water, cement solution, brass etc.
3. To enable the students to learn the latest method for determination of metals, metal ions at very low concentration in the samples using sophisticated instruments.

### **PART- A**

1. Preparation of standard EDTA solution and determination of total hardness of water.
2. Preparation of standard EDTA solution and determination of calcium oxide in the given sample of cement solution ( rapid EDTA method)
3. Determination of Cu% in brass using standard sodium thiosulphate solution.(brass solution to be prepared by weighing the brass sample)
4. Preparation of standard dichromate solution and determination of iron in the given sample solution of haematite ore ( external indicator method)
5. Determination of manganous dioxide in the pyrolusite using potassium permanganate solution ( pyrolusite is to be weighed)
6. Determination of chemical oxygen demand of the given industrial waste water sample.
7. Estimation of  $\text{Ca}^{2+}$  ions in the solution of dolomite.

### **Part – B**

1. Determination of pKa value of a weak acid using pH meter.
2. Colorimetric determination of iron/copper/any other metal.
3. Estimation of hydrochloric acid using standard sodium hydroxide solution conductometrically.
4. Determination of coefficient of viscosity of a given liquid using Ostwald's viscometer (density of the liquid is to be given)
5. Kinetics of acid hydrolysis of methylacetate.

### **Part – C**

1. Demonstration of chemistry software ó Viscosity experiment, demonstration of IR spectroscopy.
2. Demonstration of gravimetric estimation of nickel using dimethylglyoxime.
3. Demonstration of synthesis organic compound using microwave irradiation (synthesis of aspirin, glucose pentaacetate, oxidation and reduction reactions).

### **Text Books**

13. Engineering Chemistry by R. Gopalan, D. Venkappayya and Nagarajan, Vikas Publishing House Pvt. Ltd. 1999.
14. Chemistry for Engineering Students by Dr. B. S. Jai Prakash, Dr. Shivakumaraiah, Prof. R. Venugopal and Dr. Pushpa Iyengar.
15. Engineering Chemistry by Jain and Jain.

### **Course Outcome**

The students at the end of the course will be able to:

**CO1:** Learn the preparation of standard solutions.

**CO2:** Estimate the constituents in live samples like hard water, waste water, cement solution, brass etc.

**CO3:** Understand the latest method for determination of metals, metal ions at very low concentration in the samples using sophisticated instruments.

### **Scheme of Examination:**

For examination an experiment each from Part-A and Part-B shall be set. Under part-A, a common experiment shall be set for all the candidates while under part-B, different experiment may be set.

<b>Continuous Internal Evaluation (Laboratory – 50 Marks)</b>	<b>Marks</b>	<b>Semester End Evaluation(SEE) Laboratory (100 Marks)</b>	<b>Marks</b>
Performance of the student in the laboratory, every week	20	Write up	20
Test at the end of the semester	20	Experiments	60
Viva voce	10	Viva voce	20
<b>Total</b>	<b>50</b>	<b>Total</b>	<b>100</b>

**Note:** SEE shall be conducted for 100 marks for practical and the marks obtained shall be reduced for 50 Marks.

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF MATHEMATICS, BANGALORE UNIVERSITY, BANGALORE**  
**Title: ENGINEERING MATHEMATICS-I**

Course Code	<b>18BSEM101</b>					
Category	Basic Sciences					
Course title	<b>Engineering Mathematics-I (Common to all branches)</b>					
Scheme and Credits	No. of Hours/Week			Credits	Semester 6 I and II (cycle)	
	L	T	P			
	2	2	0	0		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE:3 Hrs		
Prerequisites (if any): NIL						

### **Course Objectives:**

This course will enable all students to:

1. Develop a thorough knowledge and deep understanding of definite and indefinite integrals, beta and gamma functions and their applications.
2. Study the applications of Rolls and Mean value theorems and also concept of maxima and minima.
3. Be skilled in computations and applications of infinite series and sums and analyze a nature of the given series.
4. Be able to solve the linear algebraic equations and compute eigenvalues and eigenvectors
5. Apply the concept of partial differentiation, determine Jacobians, gradient, curl and divergence of the problems which appear in engineering problems.

## **SYLLABUS**

### **Unit I:**

**Calculus-I:** Evaluation of definite and improper integrals, Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolution  
**(6 hours)**

### **Unit II:**

**Calculus-II:** Rolle's theorem, Mean value theorem, Taylor's theorems with remainders; Maxima and minima with problems.  
**(6 hours)**

### **Unit III:**

**Sequence and series:** Convergence of sequence and series, tests for convergence- ratio test, Raabe's test, Cauchy's test, root test, integral test; absolute and conditional convergence; Leibnitz's test; Summation of binomial, exponential and logarithmic series; Power series, Taylor's series, series for exponential, trigonometric and logarithmic functions.  
**(11 hours)**

### **Unit IV:**

**Matrices:** Consistency of system of equations-homogeneous, non-homogeneous, rank of a matrix; Inverse and rank of a matrix, orthogonal matrices; eigenvalues and eigenvectors of the matrix; Cayley-Hamilton theorem; Diagonalisation of square matrices.  
**(11 hours)**

## **Unit V:**

**Multivariable calculus (Differentiation):** Partial derivatives-Euler's theorem (without proof) and problems; total and implicit derivatives; evaluation of Jacobians; Method of Lagrange multipliers; Gradient, curl and divergence-problems.

**(11 hours)**

### **Text Books**

1. B. S. Grewal, "Higher Engineering Mathematics", Khanna publishers, 42nd edition, 2013.
2. E. Kreyszig, "Advanced Engineering Mathematics" - Wiley, 2013.
3. D. S. Chandrashekaraiah, "Engineering Mathematics-I", Prism Books Pvt. Ltd. 7<sup>th</sup> Edition, 2014.

### **Reference Books:**

1. B.V. Ramana "Higher Engineering Mathematics" Tata Mc Graw-Hill, 2006
2. N P Bali and M. Goyal, "A text book of Engineering mathematics", Laxmi publications, latest edition.
3. H. K Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand publishing, 1<sup>st</sup> edition, 2011.

### **E-Books:**

1. <http://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx>
2. [http://www.ec.unipg.it/DEFS/upload.linalg\\_evals\\_evecs.pdf](http://www.ec.unipg.it/DEFS/upload.linalg_evals_evecs.pdf)
3. <https://www.math.ku.edu/~lerner/LAnotes?LAnotes.pdf>
4. [https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/video-lectures/\(Gilbert%20Strang%20video%20lectures\)](https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/video-lectures/(Gilbert%20Strang%20video%20lectures))
5. [http://nptel.ac.in/downloads/122101003\(lecture notes\)](http://nptel.ac.in/downloads/122101003(lecture%20notes))

### **MOOC/NPTEL**

1. <http://nptel.ac.in>
2. <http://academicicearth.org/>

### **Course outcomes:**

On completion of this course, students are able to:

**CO1:** Use definite and indefinite integrals, beta and gamma functions appearing in engineering applications.

**CO2:** Solve problems of Rolls and Means value theorems, of maxima and minima.

**CO3:** Compute infinite series, sum an infinite series, analyze a nature of the given series.

**CO4:** Solve linear algebraic equations, compute eigenvalues and eigenvectors and diagonalize the square matrix.

**CO5:** Use partial differentiation; determine Jacobians, gradient, curl and divergence, etc.

### Scheme of examination

CIE ó 50 marks	Test I (Unit I, II &III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 Marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	<b>Q1 (compulsory):</b> MCQs type questions for 15 marks covering entire syllabus.		50 Marks	Total:100 Marks
	<b>Q2 &amp; Q3</b> from Unit I and Unit II. Respectively, shall be answered compulsorily and will not have internal choice.		17 * 2 =34 Marks	
	<b>Q4,Q5 &amp; Q6</b> from Unit III, Unit IV and Unit V respectively, shall have internal choice.		17*3=51 Marks	

**BANGALORE UNIVERSITY**  
**DEPARTMENT OF MATHEMATICS, BANGALORE UNIVERSITY, BANGALORE**  
**Title: ENGINEERING MATHEMATICS-II**

Course Code	<b>18BSEM201</b>					
Category	Basic Sciences					
Course title	<b>Engineering Mathematics-II (Common to all branches)</b>					
Scheme and Credits	No. of Hours/Week			Credits	Semester 6 I and II (cycle)	
	L	T	P			
	2	2	0	0		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE:3 Hrs		
Prerequisites (if any): NIL						

### **Course objectives:**

This course will enable all students to:

1. Understand the concept of direction cosines and ratios, planes, etc and also find the angle between straight lines and planes.
2. Be able to solve analytically all sorts of first order ordinary differential equations which often appear in engineering applications.
3. Develop analytical technique to solve various higher order differential equations of the type constant and variable coefficients, and both homogenous and non-homogeneous.
4. Analyze the Laplace transforms for various standard functions, periodic functions, compute inverse Laplace transform and solve the differential equations.
5. Understand the double and triple integral concepts, change order of integrations, variables and solve problems involving cubes, sphere and vector integrals.

### **Unit I:**

**Analytical Geometry:** Direction cosines and direction ratios, planes, straight lines, angle between planes and angle between straight lines, coplanar lines, shortest distance between skew lines, right circular cone and right circular cylinder. **(6 hours)**

### **Unit II:**

**First order ordinary differential equations:** Variable separable method, Homogeneous forms, linear, Bernoulli's equations, Exact equations, Reducible equations to exact equations, Euler's equations; Orthogonal trajectories- Cartesian and polar forms. **(6 hours)**

### **Unit III:**

**Ordinary differential equations of higher orders:** Second and higher order differential equations, homogeneous linear equations with constant and variable coefficients, non- homogeneous linear equations with constant and variable coefficients- problems, method of variation of parameters, method of undetermined coefficients. **(10 hours)**

### **Unit IV:**

**Laplace Transform:** Definition and Laplace transforms of elementary functions. Laplace transforms of  $\sin \omega t$ ,  $\cos \omega t$ ,  $e^{at} \sin \omega t$ ,  $e^{at} \cos \omega t$  (without proof), periodic functions and unit-step function- problems.

Inverse Laplace Transform-problems, Convolution theorem to find the inverse Laplace transforms (without proof) and problems, solution of linear differential equations using Laplace Transforms. **(12 hours)**

## **Unit V:**

**Multivariable calculus (Integration):** Multiple Integration: Double integrals(Cartesian), change of order of integration in double integrals, Change of variables(Cartesian to polar), Applications: areas and volumes; Triple integrals(Cartesian), orthogonal curvilinear coordinates, simple applications involving cubes, sphere and rectangular parallelopipeds; line and surface integrals, vector surface integrals, theorems of Green, Gauss and Stokes. **(12 hours)**

### **Text Books**

1. B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 42nd edition, 2013.
2. E. Kreyszig, "Advanced Engineering Mathematics" - Wiley, 2013.
3. D. S. Chandrashekaraiah, "Engineering Mathematics- II", Prism Books Pvt. Ltd. 7<sup>th</sup> Edition, 2014.

### **Reference Books:**

1. B.V. Ramana "Higher Engineering Mathematics" Tata Mc Graw-Hill, 2006
2. N P Bali and M. Goyal, "A text book of Engineering mathematics", Laxmi publications, latest edition.
3. H. K Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand publishing, 1<sup>st</sup> edition, 2011.

### **E-Books:**

1. <http://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx>
2. [http://www.ec.unipg.it/DEFS/upload.linalg\\_evals\\_evects.pdf](http://www.ec.unipg.it/DEFS/upload.linalg_evals_evects.pdf)
3. <https://www.math.ku.edu/~lerner/LAnotes?LAnotes.pdf>
4. [https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/video-lectures/\(Gilbert%20Strang%20video%20lectures\)](https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/video-lectures/(Gilbert%20Strang%20video%20lectures))
5. [http://nptel.ac.in/downloads/122101003\(lecture notes\).pdf](http://nptel.ac.in/downloads/122101003(lecture%20notes).pdf)

### **MOOC/NPTEL**

1. <http://nptel.ac.in>
2. <http://academicearth.org/>

### **Course outcomes:**

On completion of this course, students are able to:

**CO1:** Calculate the direction cosines and ratios, planes, etc and also find the angle between straight lines and planes.

**CO2:** Solve analytically all sorts of first order linear and nonlinear differential equations.

**CO3:** Solve higher order differential equations with constant and variable coefficients and also homogeneous and non-homogeneous differential equations.

**CO4:** Compute the Laplace transforms of standard functions, periodic function. compute inverse Laplace transform and solve the differential equations.

**CO5:** Evaluate the double and triple integral, change order of integrations and variables.

### Scheme of examination

CIE ó 50 marks	Test I (Unit I, II &III)- 20 marks	Quiz I ó 5 marks	25 Marks	Total:50 Marks
	Test II (Unit IV & V) ó 20 marks	Quiz II ó 5 marks	25 Marks	
SEE ó 100 marks	<b>Q1 (compulsory):</b> MCQs type questions for 15 marks covering entire syllabus.		50 Marks	Total:100 Marks
	<b>Q2 &amp; Q3</b> from Unit I and Unit II. Respectively, shall be answered compulsorily and will not have internal choice.		17 * 2 =34 Marks	
	<b>Q4,Q5 &amp; Q6</b> from Unit III, Unit IV and Unit V respectively, shall have internal choice.		17*3=51 Marks	

**Bangalore University**  
**University Visvesvaraya College of Engineering**  
**Semester I/II B.Tech. – CBCS**  
**Title: Professional English**

Course Code	<b>18HSPE108</b>					
Category	Humanities					
Course title	<b>Professional English</b>					
Scheme and Credits	No. of Hours/Week		Credits	Semester ó I and II (cycle)		
	L	T		SS		
	2	0		2		
CIE Marks: 50	SEE Marks: 50	Total Max. Marks: 100		Duration of SEE: 3Hrs		
Prerequisites (if any): NIL						

**Course Objectives:** To enable students to learn

1. Communication skills
2. Listening and Speaking skills
3. Reading skills
4. Language skills ó Grammar and Vocabulary
5. Writing skills

#### **Unit I: Communication Skills**

1. Importance of communication and its process
2. Types of communication ó verbal and non verbal, intrapersonal and interpersonal, formal and informal, mass and organizational, general and technical.
3. Channels of communication ó written media, oral media and electronic media
4. Barriers to communication ó semantic, interpersonal, organizational, cross-cultural, intrapersonal and physical
5. Greeting, introducing and making requests
6. Asking for and giving permission /directions and offering help

#### **Unit II:**

##### **a) Listening Skills**

1. Importance of listening in communication
2. Listening distinguished from learning
3. Types of listening ó Ignoring, selective listening to recall specific information, attentive listening to comprehend a lecture, empathetic listening, critical listening and creative listening
4. Techniques to hone listening skills and practice exercises for listening and phonetics.

##### **b) Speaking Skills**

1. Telephone conversations
2. Lectures or presentation using visual aids or power point to present a product or a user manual.
3. A short speech on any topic

4. Job interviews
5. Group discussion

### **Unit III: Reading Skills**

1. Skimming and scanning as techniques in reading comprehension
2. Ways of reading ó Extensive reading for pleasure, intensive reading for factual information and interactive reading on the screen.
3. Reading for local and global comprehension.
4. Reading to summarize.
5. Reading to interpret visual data such as graphs, tables, flow-charts and maps.

### **Unit IV: Language Skills**

#### **a) Grammar**

1. Present tense, Past tense and the future tense
2. Question tags
3. Prepositions
4. Articles
5. Conjunctions
6. Subject- verb agreement
7. Reported speech
8. Active and passive voice
9. Common errors
10. Modal verbs

#### **b) Vocabulary**

1. Idiomatic expressions
2. Prefixes and suffixes, synonyms and antonyms
3. One-word substitutes
4. Words often confused
5. Linking words or cohesive devices
6. Business and job-related vocabulary

### **Unit V: Writing Skills**

1. Email
2. Paragraph writing- narrative, cause óeffect, comparative and descriptive
3. Letter writing ó Letters of enquiry and complaint.
4. Resume and cover letter
5. Essay writing - types of essays ó narrative, descriptive, expository and argumentative
6. Report writing
7. Punctuation

### **Textbook**

1. Sudharshana N P and C Savitha  
English for Technical Communication, New Delhi, Cambridge University Press India Pvt. Ltd., -2016

### **Reference books**

1. Subhashini - English And Communication Skills  
Bangalore, Innovative publishers revised edition ó 2018.
2. English Language and Communication Skills óLab Manual Cum Workbook  
Delhi, Cengage Learning India Pvt., Ltd., 2014.
3. Seely, John, Oxford Guide to Effective Writing and Speaking,  
New Delhi, Oxford University Press, 1998,2005 ,2012.
4. Krishnaswamy N , Manju Dhariwal and Lalitha Krishanswamy,  
Mastering Communication Skills and Soft Skills ó Learner's Guide to Life Skills, New Delhi, Bloomsbury, 2015.
5. Tyagi Kavitha and Padma Misra,  
Basic Technical Communication, New Delhi, PHI Learning Private Limited- 2011.

### Course Outcomes:

The students at the end of the course will be able to:

**CO1:** Describe and learn communication skills.

**CO2:** Apply listening techniques to comprehend spoken English in various accents and apply English speaking skills in various contextual scenarios.

**CO3:** Apply reading techniques to comprehend passages and answer questions related to them and interpret factual information and summarize passages.

**CO4:** Practise grammar exercises and master vocabulary.

**CO5:** Demonstrate techniques to compose and edit messages for a given context with proper vocabulary and punctuation.

### Scheme of examination

<b>(i) CIE – 50 marks</b>	Test I (Unit I,II & III) -20 Marks	<b>Quiz I - 5 marks</b> <b>Quiz II - 5 marks</b>
	Test II (Unit IV & V) -20 Marks	
<b>(ii) SEE – 100 marks (to be reduced to 50 marks)</b>	<p>The question paper consists of 5 Units: Communication, listening and speaking, reading, grammar and vocabulary and writing.</p> <ul style="list-style-type: none"> <li>i. Answer questions from all the 5 Units.</li> <li>ii. Questions Q1 and Q2 on Unit I &amp; II respectively, carry internal choice.</li> <li>iii. Questions Q3, Q4 and Q5 on Unit III, IV, V respectively, are compulsory with no internal choice.</li> </ul> <p>Q3: 1. Reading comprehension passage questions 2. Summarize a passage.</p> <p>Q4: 1. Grammar questions 2. Vocabulary questions.</p> <p>Q5: 1. Paragraph writing 2. Letter/CV writing.</p>	

**Bangalore University**  
**University Visvesvaraya College of Engineering**  
**B.Tech. – CBCS(Semester I)**  
**Title: Induction Program**

Course Code	<b>18MCIP109</b>		
Category	-----		
Course title	<b>Induction Program</b>		
Scheme and Credits	Duration	Credits	Semester ó I (All programs)
	1 Week	1	
CIE Marks: 50	SEE Marks: NA	Total Max. Marks: 100	Duration of SEE: NA
Prerequisites (if any): NIL			

**Induction Program:**

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate them the ethos of the institution with a sense of larger purpose.

**Objectives:**

The purpose of induction program is to make the students feel comfortable in their new environment, open them up, set a healthy routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large and nature.

**Activities during induction Program:**

- i. Physical Activity : Games to help develop team work, yoga, gardening, etc
- ii. Creative Arts: Each student would engage in art-Visual or Performing to help in creative expression
- iii. Universal Human values: Make aware of universal human values among students for better behaviour.
- iv. Lectures by eminent people: This will motivate the students to plan for better future in their professional life.
- v. Visits: Visits to all departments, University, hostel and local important places.
- vi.

**Scheme for Assessing students:** One credit shall be awarded to a student who participates in the all the activities of the induction program.

**Bangalore University**  
**University Visvesvaraya College of Engineering**  
**Semester I/II B. Tech. – CBCS**

**Title: ಕನ್ನಡ**

Course Code	<b>18MCK N116</b>					
Category	Humanities					
Course title	Kannada					
Scheme and Credits	No. of Hours/Week				Semester 6 I and II (cycle)	
	L	T	P	SS	Credits	
	1	0	0	0	1	
CIE Marks: 50	Total Marks: 50					
Pre-requisites (if any): Nil						

**Part – A (For students knowing Kannada)**

**ಕನ್ನಡ**

**ಭಾಗ – 1**

(ಕಥೆ/ಕವನ)

- |                       |                         |
|-----------------------|-------------------------|
| 1. ಬೆಡ್‌ ನಂಬರ್‌ ಏಳು   | – ಶ್ರೀಮತಿ               |
| 2. ಗಾಂಧಿ              | – ಡಾ. ಬೆಸಗರಹಳ್ಳಿ ರಾಮಣ್ಣ |
| 3. ಶ್ರೀವಿಜಯ           | – ದಾ. ರಾ. ಬೇಂದ್ರೆ       |
| 4. ರೋಟಿ ಮತ್ತು ಕೋಡಿ    | – ಸು.ರಂ. ಎಕ್ಕಂಡಿ        |
| 5. ಎಲ್ಲ ಹುಡುಗಿಯರ ಕನಸು | – ಸವಿತಾ ನಾಗಭೂಪೆಣ        |
| 6. ಬೆಲ್ಲಿಯ ಹಾಡು       | – ಡಾ. ಸಿದ್ದಲಿಂಗಯ್ಯ      |

**ಭಾಗ – 2**

(ಸಂಸ್ಕೃತ/ಪ್ರವಾಸ ಕಥನ/ಅಂಕಣ ಬರಹ/ವಿನೋದ)

- |                                  |  |
|----------------------------------|--|
| 1. ಕನಾರ್ಚಿಕ ಸಂಸ್ಕೃತಿ ಒಂದು ಜಿತ್ರ  | – ರಹಮತ್ ತರೀಕೆರೆ                        |
| 2. ಶಾಸನಗಳಲ್ಲಿ ಕನಾರ್ಚಿಕ ಸಂಸ್ಕೃತಿ  | – ಡಾ. ವಿ. ಜಯರಾಮ್<br>(ಬಹುಮುಖಿ ಕೃತಿಯಿಂದ) |
| 3. ದೋಷ ಹರಿಗೋಲುಗಳಲ್ಲಿ             | – ಡಾ. ಕೆ. ಶಿವರಾಮ ಕಾರಂತ                 |
| 4. ಗುಬ್ಬಚಿಯ ಗೂಡು                 | – ಪಿ. ಲಂಕೇಶ್                           |
| 5. ನಮ್ಮ ಎಮ್ಮೆಗೆ ಮಾತು ತಿಳಿಯುವುದೇ? | – ಗೊರೂರು ರಾಮಸ್ವಾಮಿ ಅಯ್ಯಂಗಾರ್           |

**ಭಾಗ – 3**

(ವ್ಯಕ್ತಿ ಚಿತ್ರ/ಪ್ರಬಂಧ/ಪರಿಸರ ಲೇಖನ)

- |                                    |                             |
|------------------------------------|-----------------------------|
| 1. ಡಾ. ಸರ್. ಎಂ. ವಿಶೇಷರಯ್ಯ          | – ಡಾ. ಎ.ಎನ್. ಮೂರ್ತಿರಾವ್     |
| 2. ಅಣ್ಣಪ್ಪನ ರೇಣ್ಣೆ ಕಾಯಿಲೆ          | – ಕುವೆಂಪು                   |
| 3. ವೃತ್ತಿ ಶಿಕ್ಷಣದಲ್ಲಿ ಕನ್ನಡ ಮಾಧ್ಯಮ | – ಎಸ್. ಸುಂದರ್               |
| 4. ಜೀಂಕ್ ಮೇಸ್ಟ್ ಮತ್ತು ಅರಿಸ್ಟಾಟಲ್   | – ಕೆ.ಪಿ.ಮೂರ್ತಿಚಂದ್ರ ತೇಜಸ್ಸಿ |

## ಪಠ್ಯ ಮಸ್ತಕ:

1. ಕನ್ನಡ ಮನಸು, ಪ್ರಸರಾಂಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಪಿ

## ಪಾರಮಾರ್ಥನ ಗ್ರಂಥಗಳು:

- |                                       |                     |
|---------------------------------------|---------------------|
| 1. ಗ್ರಾಮಾಯಣ                           | - ರಾವ್ ಬಹುದ್ವಾರ್    |
| 2. ಕಾನೂರು ಹೆಗ್ಡೆಡತಿ                   | - ಶುವೇಂಪು           |
| 3. ನಮ್ಮ ಹೊಟ್ಟೆಯಲ್ಲಿ ದ್ವಿತೀಯ ಅರ್ಥಾರ್ಥಿ | - ಬಿ.ಜಿ.ಎಲ್. ಸ್ವಾಮಿ |
| 4. ಬಹುಮುಖಿ                            | - ಡಾ. ವಿ. ಜಯರಾಮ್    |

## **Part - B (For students not knowing Kannada)**

### **KANNADA KALI**

#### **UNIT - I**

**Lesson-1:** Introducing each other-1. Personal Pronouns, Possessive forms, Interrogative forms.

**Lesson-2:** Introducing each other-2. 1. Personal Pronouns, Possessive forms, Yes/No type, Interrogation.

**Lesson-3:** Absolute Ramayana. Possessive forms of nouns, dubietive question, relative nouns.

**Lesson-4:** Enquiring about a room for rent, Qualitative and Quantitative adjectives.

**Lesson-5:** Enquiring about the college, Predicative forms, locative case.

**Lesson-6:** In hotel-dative case defective verbs.

**Lesson-7:** Vegetable market, Numeral, Plurals.

#### **UNIT - II**

**Lesson-8:** Planning for a picnic, Imperative, Permissive, hortative.

**Lesson-9:** Conversation between doctor and patient. Verb-iru, negation-illa, non-past tense.

**Lesson-10:** Doctor's advice to patient, potential forms, no-past continuous.

**Lesson-11:** Discussing about a film, past tense, negation.

**Lesson-12:** About Brindavan Garden, Past tense, negation.

**Lesson-13:** About routine activities of a student, verbal principle, reflexive form, negation.

**Lesson-14:** Telephone conversation, past and present perfect, past continuous and their negation.

**Lesson-15:** About Halebid, Belur, relative, principle, Negation.

**Lesson 16:** Discussing about examination and future plan, simple conditional and negative.

#### **UNIT - III**

**Lesson-17:** Kanrataka (Lesson for reading)

**Lesson-18:** Kannada Bhaashe (Lesson for reading)

**Lesson-19:** ManataruvaSangatialla (Lesson for reading)

**Lesson-20:** BekuBedagalu (Lesson for reading)

**REFERENCE BOOKS:**

1. Kannada Kali – Dr. Lingadevaru Halemane
2. Kannada Paatagalu – Editor: Dr. Chandrashekara Kambara.

**Scheme of examination:**

**Students have to answer either Part A or Part B**

<b>(i) CIE - 50 marks</b>	Test I – 20 Marks	<b>Quiz I</b> - 5 marks
	Test II – 20 Marks	<b>Quiz II</b> - 5 marks

BANGALORE UNIVERSITY

UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING  
K R Circle, Bengaluru-560 001.

PART II

Academic Rules and Regulations

For

(Undergraduate Programme  
Bachelor of Architecture)

on

Choice Based Credit System (CBCS)

(Effective from the Session August 2018)

Bangalore University  
**UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING**  
K R Circle, Bengaluru - 560 001.

### **Vision of The Department**

The vision of Department of Architecture is to strive for excellence in advancing Architectural education through path breaking innovations across the frontiers by integrating creative approach towards human knowledge to realize a vibrant, inclusive and humane society.

### **Mission of The Architecture Department**

1. To promote general awareness regarding the necessary of architecture and its impact on built environment. Also to reach out to the disadvantaged sections of Society, who do not have access to higher design education.
2. To prepare faculty and students for leadership roles in the fields of Architecture, Construction Science, Community Development and Digital Media Arts

### **Program Education Objectives (PE0)**

The graduates will be able to

- 1) ARPE01: To perceive higher education in the field of architecture and related fields.
- 2) ARPE02:To stimulate artistic Sensitivity and creative powers,
- 3) ARPE03:To strengthen intellectual growth and the capacity to develop creative and responsible solutions to complex and changing problems

### **Program outcomes Architecture programs**

PO1. Architecture knowledge: Apply the knowledge of mathematics, science, Architecture fundamentals, and an Architecture specialization to the solution of complex Architecture problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyse complex Architecture problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and Architecture sciences.

PO3. Design/development of solutions: Design solutions for complex Architecture 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 Architecture and IT tools including prediction and modelling to complex Architecture 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 Architecture practice.

PO7. Environment and sustainability: Understand the impact of the professional Architecture 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 Architecture 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 Architecture activities with the Architecture community and with the 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 Architecture 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 andability to engage in independent and life-long learning in the broadestcontext of technological change.

### **Program Outcomes (PSOs)**

The graduates will be able to

- 1) ARPS01:acquire the individual capabilities necessary for the competent practice of architecture and lifelong learning.
- 2) ARPS02: pluralistic approach to the learning of architecture.
- 3) ARPS03: explore as an integral part of the architectural design process, the physical context, the properties of natural forces, and building systems.
- 4) ARPSO4:build a team of his own and work in a team with professional ethics.

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# **CHOICE BASED CREDIT SYSTEM (CBCS)**

## **Preamble:**

The Council of Architecture had prescribed the Council of Architecture (Minimum Standards of Architectural Education) Regulations, 1983, in the year 1983. Since then, the architectural education has undergone a significant change. This has necessitated review of these standards with a fresh perspective, keeping in mind the present demands of the architectural education in the country and to introduce them with changes, wherever necessary.

The Council of Architecture is empowered under Section 21 of the Architects Act, 1972 to prescribe the Minimum Standards of Architectural Education required for granting recognized qualifications by colleges or institutions in India. Pursuant to Section 21, the Council has, from time to time, prescribed various Minimum Standards of Architectural Education during its past meetings viz.

These standards are now being prescribed and adopted by the Council as Council of Architecture - Minimum Standards of Architectural Education, 2017, which shall supplement the Regulations of 1983. All institutions imparting architectural education in the country for awarding recognised architectural qualifications under the Architects Act, 1972, shall be required to adhere to these minimum standards of architectural education.

## **3. BROAD OBJECTIVES**

Essentially to meet the growing needs for architects in this fast growing city of Bangalore and other rapidly urbanising centre of Karnataka. To create a pool of resource people to cater to expanding variety of needs of built environment Viz. Design, Construction & Planning.

## **4. SHORT TITLE AND COMMENCEMENT**

- 2.1 The course shall be called the degree course in Bachelor of Architectures, in short B.Arch.
- 2.2 The course shall be of FIVE academic years duration and conducted in TEN Semesters, each semester having a duration of 19 weeks including Exams.
- 2.3. The Calendar of events in respect of the course shall be as fixed by the University from time to time.
- 2.4. Examination in all the subjects of all the Ten Semesters will be conducted after end of each semester except when there are no candidates appearing for any subject.

#### **4. DEFINITIONS**

- 1 Academic Autonomy: Freedom granted by the University to the College in all aspects of conducting its academic Programmes for promoting academic excellence.
- 2 Academic Year: Two consecutive (one odd + one even) semesters shall constitute one academic year.
- 3 Act means the Architects Act, 1972 (20 of 1972);
- 4 Audit Courses: Students to be able to register for courses outside the prescribed range of credits for audit only, when interested to supplement their knowledge/skills; Optional for students to appear/pass in CIE, SEE of these courses and/or seek their inclusion in the Grade cards or Transcripts issued (but, not for earning Credit);
- 5 Autonomous College: A College notified as an autonomous College as per the Bangalore University Statutes / UGC
- 6 Choice Based Credit System (CBCS): CBCS helps in customizing the course work for a student, through Core and Electives courses;
- 7 College: University Visvesvaraya College of Engineering (UVCE).
- 8 Continuous Internal Evaluation (CIE): To be normally conducted by the Course Instructor and includes mid-term class tests, home work, problem solving, reviews/juries, group discussion, periodical submissions, desk-crits, quiz, mini-project & seminar throughout the semester, with weightage for the different components being flexible as decided by the subject teachers. Instructor also to discuss on CIE performance with students. CIE is also termed as 'Internal Assessment'.
- 9 Council means of Council of Architecture constituted under Section 3 of the Act.
- 10 Course Evaluation: CIE and Semester End Examination(SEE) to constitute the major evaluations prescribed for each course, with only those students maintaining a minimum standard in CIE being permitted to appear in SEE of the Course.
- 11 Course Registration: Every student to formally register for Courses(Credits) under faculty's advice in each Semester for the Institution to maintain proper record; Helpful for monitoring the CIE, SEE performance in each case and to assist the students by mentoring.
- 12 Course: Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weightage. The courses should define learning objectives and learning outcomes. A course may be designed to comprise studios/ lectures/ tutorial /laboratory works / case studies / field work / thesis / professional training /viva voce / seminars /term papers/assignments/presentations/self-study or a combination of some of these.
- 14 Credit Based System (CBS): A credit system enables quantification of course work with credits being assigned to each course after a student completes its teaching-learning process, followed by passing in both CIE & SEE. Under the CBS, the requirement for awarding a degree or certificate is prescribed in terms of total number of credits to be earned by the students.
- 15 Credit Courses: All Courses registered by a student in a Semester to earn credits; In a widely accepted definition, students must earn Credits by

- registering and passing a Course.
- 16 Credit Point: It is the product of Grade Point(GP) and Number of Credits for a course; i.e., Credit Points(CrP) = GP X Credits for the Course.
- 17 Credit: A unit by which the course work is measured. It indicates the relative importance of a given course subject.
- 18 Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is a ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all the courses in all the semesters. It is expressed up to two decimal places.
- 19 Executive Committee-means the Executive Committee constituted under Section10 of the Act;
- 20 Faculty- means the teaching staff members in the service of an institution;
- 21 First Attempt: If a student has fulfilled all prerequisites and has become eligible to attend the Examinations and has attended at least one head of passing, such attempt (first sitting) shall be considered as first attempt.
- 22 Grade Point Average(GPA): Computation of Semester GPA (SGPA) to be done by dividing the sum of credit points(CrP) of all Courses by the total number of Credits(Cr) registered in a Semester, leading finally to CGPA for evaluating student's performance at the end of two or more Semesters cumulatively.
- 23 Grade Point(GP): Students to earn GP for a Course based on its Letter Grade. It is a numerical weightage allotted to each letter grade on a 10- point scale; e.g., on a typical 10 - point scale, GP to be: S=10, A=09, B=08, C=07, D=06, E=04 & F=00; Useful to assess student's achievement quantitatively and to compute Credit Points.
- 24 Grading: Represented using Letter Grades as qualitative measure of achievement in each Course i.e., S(Outstanding), A(Excellent), B(Very Good), C(Good), D(Above average), E(Average) & F(Fail), based on the marks(%) scored in (CIE+SEE) of the Course and conversion to Grade done by Absolute Grading;
- 25 Institution means a department of University/ college/school of architecture in India imparting instructions for recognized qualification; India imparting instructions for recognized qualification;
- 26 Letter Grade: It is an index of performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.
- 27 Passing Standards: Student passing a Course only when getting GP greater or equal ( $\geq$ ) 04 (E Grade) in each registered course.
- 28 Programme: An educational programme leading to award of a Degree or Certificate.
- 29 Recognized qualifications- means any qualification in architecture for the time being included in the Schedule appended to the Act or notified under section15 of Act.
- 30 Semester End Examination (SEE): Conducted at the University level covering the entire Course Syllabi. For this purpose, Syllabi to be modularized and SEE questions to be set from each module, with choice if any, to be confined to module concerned only. The questions to be comprehensive, emphasizing analysis, synthesis, design, problems & numerical quantities.
- 31 Semester Grade Point Average (SGPA): It is a measure of academic performance of student/s in a semester. It is the ratio of total credit points

- secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- 32 Semester: The B.Arch. Degree Programme to be ordinarily of 5 academic years (= 8+1 Semesters), with the year being divided into two semesters of approximately 19 weeks, each for course work, followed by Continuous Internal Evaluation (CIE) in the Semester & Semester End examination (SEE) as reforms in CBCS system for Achievement Testing. The odd semester may be scheduled from August to January and even semester from February to July.
- 33 Statutes: Bangalore University Statutes
- 34 Transcript or Grade Card or Certificate: Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (Code, Title, Number of Credits and Grade secured) along with SGPA of that semester and CGPA earned till that semester.
- 35 University: Bangalore University, Bengaluru (BUB).

## **5. NOMENCLATURE OF ACADEMIC PROGRAMMES**

4.1. The Course shall be called the Degree Course in Bachelor of Architecture abbreviated as B. Arch. shall be the nomenclature and the corresponding abbreviation for this programme. which will be used for the Degree Programmes under the University, as required by Council of Architecture Norms (COA):

## **5.DURATION OF THE ACADEMIC PROGRAMMES**

As Choice Based Credit System is followed, the Programme duration shall be dictated by the period in which a student earns the prescribed number of credits for the award of Degree.

### **5.1. Normal Duration**

5.1.3. The duration of B.Arch. programme shall be five years.

### **5.2. Maximum Duration**

5.2.1. The maximum duration that a student can take to complete a full time academic Programme shall be twice the normal duration of the Programme, i.e ten years for B.Arch. students.The academic programme shall be spread over 10 semesters, during Ninth and Tenth semester, the candidate shall undergo professional training and there shall be a project work (Thesis) in the Eight Semester.

5.2.2 The Curriculum structure of the Architecture program shall follow the guidelines as outlined in point number 6 under the Choice Based Credit System. However, the modes of periodic assessment, end semester and viva voce examinations, weightages and grading system are left to the discretion of the Department.

- 5.2.3 A candidate shall not be permitted to enroll for the Architectural Design course in a semester unless he/ she has completed the Architectural Design course of the previous semester.
- 5.2.4 A candidate shall be awarded the degree in Architecture program by the University for having earned the minimum credits as specified in the curriculum.
- 5.2.5 The Architecture Program shall be completed in a maximum period of 8 years. However, in special circumstances a candidate may be granted an extension of 1 year by the University to complete the program. This extension shall be given only once to the candidate.

### **5.3.Admissions to B.Arch. course shall be governed as per COA**

- 5.3.1 Admission to B. Arch course is done by or as per regulations of council of architecture. Those who are eligible for admission as per 5.3.2, 5.3.3, 5.3.4, must take the aptitude Test. Those who pass this test can only be admitted.
- 5.3.2 a) Admission to the first year course shall be open to students who have passed (i) The Two Year Pre-University Examination conducted by the Karnataka State Pre-University Board and (ii) Plus Two with Physics, Chemistry and Mathematics as Optional subjects and English as a subject of study or any other examination recognized by the University equivalent there to be as per norms  
 b) Candidates shall have secured a minimum of 50 percent Marks in the aggregate of the three optional subjects i.e., Physics, chemistry and Mathematics of Second Year of the qualifying Examination or at the public Examination held at the end of XII year to be considered eligible for admission to first year B.Arch by the University.  
 c) However, candidates belonging to scheduled castes, scheduled Tribes and any other group classified by the Government of Karnataka for such purposes will be considered eligible for admissions if they have passed the two year PUC examination or equivalent examination with the group of optional subjects and English as stated in 5.3.2 a above.
- 5.3.3 Diploma holders in Architectures granted by the Board of Technical Examination in Karnataka or equivalent who have obtained not less than 50% of the total maximum marks in the Final examination leading to the said Diploma, provided that the minimum marks for the purpose of qualification Specified above shall not be less than 35% in the case of candidates belonging to Scheduled castes, scheduled tribes and backward tribes, or any other groups classified by the Government of Karnataka for such purposes, in the appropriate branch.

5.3.4 All the candidates seeking admission to B.Arch. shall pass the NATA(National Aptitude Test in Architecture) conducted by the Council of Architecture, New Delhi. Currently, the pass marks is 80 out of 200 in the NATA . This requirement is to be fulfilled by all candidates including those belonging to Scheduled Castes, scheduled tribes and other classified groups. Those students, who have passed a qualifying examination other than the PUC II examination of the Pre-University Education Board of Karnataka, have to obtain eligibility certificate for seeking admission to B.Arch. Degree Programme from UVCE. The eligibility criteria for admission of students to UG Degree Programmes shall be the same as those prescribed by the State Government / University / College from time to time. Students admitted on the basis of 5.3.3 are not eligible for Exemption of any subject in B.Arch Degree Course.

#### **5.4. Semester Scheme**

The semester scheme is adopted for B. Arch. Programmes.

**5.5. Academic Calendar,** An academic year consists of two regular semesters and a fast track semester, the details of which are shown in Table 2.

<b>Sl. No.</b>	<b>Activity</b>	<b>Description</b>	
1	Number of semesters in an academic year	Two regular semesters (Odd and Even) and one Fast Track Semester	
2	Duration of Regular Semester	19 weeks	
3	Duration of Fast Track Semester	08 weeks	
4	Academic activities (duration in weeks)	Regular Semester(s)	Fast Track Semester
	Course Registration	01 Day	01 Day
	Course Work including CIE	15 Weeks	06 Weeks
	Examination preparation, SEE, Valuation, Re-evaluation and Declaration of Results.	04 Weeks	02 Weeks
5	Evaluation	Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) shall have equal weightage in the student's performance in Course/Laboratory Work and other activities.	
6	Re-registration	Students failing in any Course(s) shall re-register for the same Course(s) and shall appear for CIE and SEE afresh in each such Course(s). This shall continue until a pass grade is obtained in the said course(s).	

7	Fast Track Semester at the end of Even Semester	Fast Track Semester may be conducted for failed students before the commencement of the next semester.
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## **5.6. Courses, Periods of Study And Subjects Of Examination Under Choice Based Credit System For The Architecture Degree Program**

- 5.6.1 Under the Choice based credit system, which is a student/ learner centric system, the courses of study in the Architecture Degree program shall be as under:
- 5.6.2 Professional Core (PC) Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.
- 5.6.3 Basic Sciences and Applied Engineering (BS & AE) Course: A course which informs the Professional core and should compulsorily be studied.
- 5.6.4 Elective Course: Generally, a course which can be chosen from a pool of courses and are of two types:
- (i) Professional Elective (PE) which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope
  - (ii) Open Elective (OE) which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill
- 5.6.5 Employability Enhancement Courses (EEC) which may be of two kinds: Employability Enhancement Compulsory Courses (EECC) and Skill Enhancement Courses (SEC)
- 5.6.6 The Weightage in terms of Credits for each of the above in the prescribed curriculum of the institution shall be as follows:
- |  |        |
|--|--------|
| 1. Professional Core Courses (PC)                                | : 45%  |
| 2. Building Science and Applied Engineering (BS&AE)              | : 20 % |
| 3. Elective Courses  |        |
| (i) Professional Electives (PE)                                  | : 10%  |
| (ii) Open Electives (OE)   | : 5%   |
| 4. Professional Ability Enhancement Courses (PAEC)               |        |
| (i) Professional Ability Enhancement Compulsory Courses (PAECC): | 15%    |
| (ii) Skill Enhancement Courses (SEC)                             | : 5%   |

Note: Where it is not possible to offer Open Electives, Professional Electives may have a weightage 15% of the total credits.

- 5.6.7 The suggested list of courses under each of these groups is provided in below
- a) Professional Core (PC) 1. Basic Design and Visual Arts 2. Architectural Design 3. Architectural Design Thesis 4. Architectural Graphics and Drawing 5. History of Architecture and Culture 6. Principles/ Theory of Architecture 7. Urban Design 8. Human Settlements Planning 9. Housing 10. Landscape Design 11. Site Planning 12. Carpentry and Model Making Workshop 13. Specifications, Cost Estimation and Budgeting
  - b) Building Sciences And Applied Engineering (BS& AE) 14. Building Materials 15. Building Construction 16. Applied Mechanics 17. Structural Design and Systems 18. Climatology 19. Building Services 20. Surveying and Leveling 21. Acoustics 22. Environmental lab 23. Environmental Science for Architecture.
- 5.6.8 Elective Course (EC) The list of electives given below is suggestive and the department shall adopt the electives as found feasible.
- a) PROFESSIONAL ELECTIVE (PE) 24. Theory of Design 25. Vernacular Architecture 26. Interior Design 27. Art Appreciation 28. Art in Architecture 29. Graphic and Product Design 30. Contemporary Processes in Architecture 31. Architectural Journalism 32. Disaster Mitigation and Management 33. Green Buildings and Rating Systems 34. Sustainable Cities and Communities 34A. Building Performance and Compliance 35. Architecture of South East Asia 36. Architectural Design with Steel 37. Architectural Design with Glass 38. Furniture Design 39. Appropriate Building Technologies 40. Earthquake Resistant Architecture 41. Architectural Conservation 42. Building Systems Integration and Management \
  - b) Open Elective (OE) Courses approved by the department from subjects of study other than Architecture which will add value to the program and enable the overall development of the student professional ability enhancement courses professional ability enhancement compulsory courses 43. Professional Practice 44. Internship/ Practical Training 45. Project Management 46. Dissertation /Seminar/ Research Methodology
  - c) Skill Enhancement Courses 47. Communication Skills 48. Computer Studio 49. Building Information Modeling 50. Digital Graphics and Art 51. Entrepreneurship Skills for Architects 52. Foreign Language.

5.6.9 The regulations and curriculum of the department shall be:

- a) Provide flexibility in the teaching/ learning system to permit the students to complete program at their own pace.

5.6.10 Teaching and learning methods

- a) The contents of the courses as listed in 5.6.7 shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs/ workshops, studio exercises and design projects, internships and study tours.
- b) Lectures are held to teach basic connections and the systemization of theoretical knowledge and the methodology of scientific work. Specific subjects are presented in a well-structured form, incorporating new research results. The results shall be evaluated through periodic assessment of sessional work or an end semester examination or both.
- c) In Seminars the contents shall be taught in dialogue and discussion phases between the teacher and the student. The results shall be evaluated through periodic assessment of sessional work and/ or end semester examination or both
- d) In labs/ workshops the contents of the course shall be delivered through hands on work and experiments. The results shall be evaluated through periodic assessment of sessional work or end semester examination or both.
- e) In studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and an end semester examination/viva-voce.
- f) In design studios/construction studios/projects the students contribute to the processing, analysis and the solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury/ panel.
- g) In Internship the students engage in work in an architectural practice/ government architecture departments and train specifically under architects registered with the Council. The results shall be periodically assessed by the

architect under whom they are assigned and defend their portfolio in front of a jury/ panel at the end of the internship period.

- h) Study tours shall be part of the program and conducted every year. They help to consolidate course contents by acquainting students not only with professional practice but also the culture and context of a region. Note: These learning and teaching methods are only suggestive and every institution can innovate and engage in a pedagogy based on the strength of the institutions.
- i) While calculating credits the following guide lines shall be adopted
  - (i) 1 lecture period/ hour shall have 1 credit;
  - (ii) 2 lab/workshop/ studio exercises/seminar periods/ hours shall have 1 credit and
  - (iii) 1 design studio/construction studio/project/thesis period/ hour shall have 1.5 credits. For Practical training total number of credits shall be specified for one semester only.
- j) Course work for every Semester except the Internship/ practical training semester and Architectural Design Thesis Semester shall preferably have 3 or 4 lecture based courses; 2 lab/seminar/studio exercises courses and 1 Design course. Suggested structure for one semester of the B.Arch Program is worked out in the table below

Type of Course	Credit per Course	Periods/Hours of Study per course		No. of Courses	Total Credits
		Lecture	Studio/Lab/Workshop/Seminar		
Lecture	3	3	-	3 or 4	9 to 12
Lab/workshop/studio exercises/seminar	3	1	4	2	6
Design Project	Can vary from 9 in the lower semesters to 15 in the higher semester	-	Varies from 6-10	1	Varies from 9

- (i) All courses of study put together would engage the students for a minimum of 26 periods/ hours of study a week and a maximum of 30 periods/ hours a week.
- (ii) (a) Every semester shall offer a minimum of 26 credits and a maximum of 30 credits.  
 (b) Credits for the Architectural Design Project/Thesis can vary from 15 to 18.

- (iii) The total number of credits for the B. Arch Degree Course could vary from a minimum of 260 credits to a maximum of 300 credits.
- (iv) This structure is suggestive and offers flexibility for the institutions to adopt as feasible

#### **5.6.11 Guidelines for Conduct of Practical Training and Architectural Design Thesis**

- a) Practical Training shall be undergone during 9<sup>th</sup> and 10<sup>th</sup> semester of the Architecture Degree program for a period of two semesters in the office of an architect or an organization operating in an allied field of practice or research, duly approved by the institution, under mentorship of an architect having experience of at least 5 years.
- b) The practical training shall be supervised and evaluated through periodic assessment by the mentoring architect and end semester examination (viva voce) as part of curricular studies.
- c) Training in Foreign Country shall be done under the Registered Architect of that Country and to be approved and monitored by the Head of the Institution.

#### **5.6.12 Architectural Design Thesis**

- a) The Architectural Design Thesis shall be prepared under the guidance of a core Faculty member.
- b) The Institution shall conduct the internal evaluation at stages for the Architectural Design Thesis with the guide as a co-assessor.
- c) A jury comprising of an internal and external examiner and the guide shall conduct the final examination (Viva-voce) of the Architectural Design Thesis. External Examiners shall have minimum 10 yearsøexperience.
- d) Practical Training shall be completed before the commencement of Architectural Design Thesis

## **7. PROCTOR SYSTEM**

### **6.1. Introduction**

The Proctor system makes the students punctual and helps them to complete their studies successfully. The faculty is the Proctor and the student is the Procree.

### **6.2. Objective(s)**

- 6.2.1. To guide and fulfil the academic requirements of the students.
- 6.2.2. To advise the students appropriately from time to time.
- 6.2.3. In addition, the Procree shall respond positively to fulfil 6.2.1 and 6.2.2.

### **6.3. Roles and Responsibilities**

- 6.3.1. The proctor shall monitor the student who fails to satisfy minimum attendance (75 %) and internal marks (40 %) in all Courses, as per Regulations.
- 6.3.2. The Proctor and Proctee shall maintain updated diary, complete in all respects from time to time.
- 6.3.3. The proctor shall arrange for a meeting with the students at least once in a month and submit the proceedings to the concerned Chairpersons of the Department.
- 6.3.4. The proctor shall invite the parents for discussion at least once in every semester to update the academic progress of their ward, in case of non-performing and irregular students.
- 6.3.5. The Proctor shall arrange to send the progress reports to the Parents/Guardian regarding the details of Attendance, Test Marks, Examination results etc.
- 6.3.6. Proctor shall ensure that the students should not indulge in any sort of ragging activity inside the campus/hostel.

### **6.4. Expected Outcome**

Results in enhanced performance and holistic development of the students.

## **8. CREDIT SYSTEM**

### **7.1. General**

- 7.1.1. The Choice Based Credit System (CBCS) comes into effect from the academic year 2018-2019. The students have the option of choosing from a wide range of electives offered in the Department, Cluster of Departments and the Institution. In addition, Value-added Credit Courses are offered as part of extended learning in interdisciplinary and multi-disciplinary domains.

### **7.2. Credit Structure**

- 7.2.1. A typical Credit Structure for Course work (Hour/Week in a Semester) in B.Arch. Programme is shown in 5.6.7.0

However, in case of fast track semester, the Course load is multiplied by Two. These guidelines form the basis to fix semester Course load and weekly contact hours in the Regular/Fast track semesters.

## **9. COURSE LOAD IN REGULAR SEMESTER(S)**

The minimum credit requirement for B. Arch. degree is 277 credits. The lower and upper limit for course credits registered in a semester by a full time student of a degree program are: Lower limit 26 Credits Upper limit 31Credits

## **8.1 Degree Requirements**

The Degree requirement of a student for the B.Arch. programme are as follows:

4. College requirements:
  - iii) Minimum Earned Credit Requirement for Degree (Table 4)
  - iv) Satisfactory completion of all Mandatory Learning courses
5. Programme Requirements:

Minimum Earned Credit Requirements on all core courses, professional elective courses, open electives and major/minor project as specified. No extra credits earned on core/elective courses can be allowed in lieu of credits earmarked for major/minor project.

## **8.2 Graduation Requirements and convocation**

1. A student shall be declared to be eligible for the award of the degree if he/she has
  - iv) Fulfilled Degree Requirements.
  - v) No Dues to the College, Departments, Hostels, Library, Central Computer Centre and any other centres of the institution.
  - vi) No disciplinary action pending against him/her.
2. The award of the degree must be recommended by the University.

**8.3.** The total number of credits required to be earned by a student to qualify for the award of the B.Arch degree is shown in Table 4.

**Table 4: Credits Required**

Programme	Normal Duration		Total number of credits to be earned
	Years	Semester	
B.Arch.	5	10	277

## **11. COURSE LOAD IN FAST TRACK SEMESTER**

The Fast Track Semester is helpful for students who have failed in their Examinations. The significance of Fast Track Semester is to avoid loss of an academic year to the student. It is the discretion of the Department or College to offer the Fast Track Semester. The Fast Track Semester is a Special Semester and the student shall not demand it as a matter of right.

During the Fast Track Semester, a student is permitted to Re-Register for Course(s) where he / she has secured F-Grade. No new Courses are allowed for Registration. A student is

permitted to register for a maximum of 9 Credits in a Fast Track Semester (excluding credits due to Self-Study component, as the marks earned in the Self-Study component in the Regular Semester is carried forward in the Fast Track Semester).

The Department/College may offer Courses based on the availability of resources. The student has to opt from those Courses offered by the Department in a given Fast Track Semester. Students have to re-register for courses in the regular semester when offered, if not offered in the Fast Track Semester. The student has to pay a special fee prescribed by the College to register for a Course in the Fast Track Semester.

## **12. Curriculum Framework**

- 10.1. Contact Hours: The maximum number of contact hours for the students is set at 30 Hrs/Week. This helps the students in getting enough time and opportunity to develop their creative talents and abilities, benefitting from add-on Courses and also those opted for audit Courses, in addition to the ones prescribed for credit under a Programme and preparing them for challenging and exciting careers.
- 10.2. Curriculum framework is important in setting the right direction for a Degree Programme, as it takes into account the type and quantum of knowledge necessary to be acquired by a student to qualify for award of a Degree in his/her chosen branch.
- 10.3. Besides, this also helps in assigning the credits for each Course, sequencing the Courses semester-wise and finally arriving at the total number of Courses to be studied and the total number of credits to be earned by a student to fulfil the requirements for conferring the B.Arch. Degree.
- 10.4. Table-5 shows a typical Curriculum framework for B.Arch. Degree Programme. The average number of credits are only indicative and not fixed.

**Table 5: Curriculum Framework for B.Arch**

<b>Sl. No.</b>	<b>Subject Area And code</b>	<b>Average No. of Credits</b>
1	Humanities and Social Science including Management Courses (ARHU)	2
2	Art Courses (FART)	2
3	Engineering subjects Civil (AREN)	2
4	Architecture Core Courses -(ARCH)	8
5	Professional Elective Courses relevant to chosen Specialization/ Branch (ARPE)	2
7	Project work, seminar and internship in industry or elsewhere (ARPW)	2
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Kannada]	2

(ARMC)	
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**Table 6: Curriculum Framework for B.Arch.**

Sl. No.	Subject Area	Credits
1	Humanities and Social Science Courses	04
2	Professional Core Courses	191
3	Professional Elective Courses	06
4	Art courses	04
5	Professional Training	48
6	Engineering Courses	24
	Total	277

## 11. MANDATORY COURSES FOR B.Arch PROGRAMME

The UG Degree Programmes require the inclusion of certain Courses like induction programme proficiency in Kannada, Constitution of India, Environmental Science, Bridge Courses and additional Courses suggested by respective BOS for the completion of the Programme as Mandatory Courses. Mandatory Courses shall carry credits.

### 11.1Mandatory Courses for B.Arch. Programme:

The B.Arch. Programme requires the inclusion of Courses like Kannada language, and Constitution Law suggested by respective BOS for the completion of B.Arch. Programme as mandatory Courses and are shown in Table 7. These Courses will not carry any credits, but a pass in each such Course after attaining required CIE or SEE requirements during the Programme shall be a necessary requirement for the student to qualify for the award of Degree.

**Table 7. Mandatory Courses for B. Arch. Programme**

Sl. No.	Mandatory Courses
1	Professional English
2	Kannada Language
3	Constitution of India and Professional ethics
4	Environmental Studies
5	Personality development and communication

## **12. ASSESSMENT**

The CBCS consists of the following Assessment Rules:

### **12.1 Performance evaluation**

12.1.1 The assessment of student's performance during and /or at the conclusion of an academic semester has to be done by Examinations. In general, Examination may have different goals like understanding a concept, problem solving, creativity testing and endurance testing.

12.1.2 Typically, these goals can be tested by two methods:

- b) Continuous Internal Evaluation (CIE): CIE shall be conducted by the Faculty in-charge of the course throughout the semester. The CIE includes, but not limited to, Home-Works/Assignments, Group Discussions, Quizzes, Class Room Problem Solving, Seminars, Mini-Projects, Tests.
- d) Semester End Examinations (SEE): SEE shall be conducted at the end of each semester to evaluate the performance of the student covering the entire syllabus of the Course. The dates are fixed by the College/University and includes a written Examination for Theory Courses and Practical/Design Examination for the Laboratory/Design Course and Project work examination.
- e) Students performance in a Course shall be decided by taking into account the performance in CIE and SEE individually and also taken together.

### **12.2 Question Papers**

12.2.1 It is necessary for the Course Syllabi to be well drafted, be defect-free and be modularized to enable the setting of good question papers covering the whole syllabus, and in compliance with Outcome Based Education (OBE) including action verbs of Blooms Taxonomy. These aspects have to be addressed by the Board of Studies (BoS).

12.2.2 Question Paper Planning: Question paper shall cover the entire syllabus, with a provision for the students to compulsorily answer questions from the full syllabus. As the students need to be given choice in the questions, it is preferred for the question paper at SEE, in particular, to have built-in choice. The Board

of Examiners (BoE) shall take note of choice in paper setting, while planning for the question papers.

12.2.3 Question Paper Pattern: For an effective evaluation of a student in a Course, balanced question paper needs to be used as the principle tool. This makes it necessary for the question papers, used at CIE and SEE, to be in conformity with Outcome Based Education to:

- cover all sections of the course syllabus uniformly.
- be unambiguous and free from any defects/errors,
- contain adequate data/other information on the problems assigned.
- have clear and complete instructions to the candidates,
- emphasize knowledge testing, design, problem solving and qualitative analysis.

12.2.4 Typical Question Paper: The questions to be included in the question papers at CIE and SEE can be of two types:

(iii) Multiple Choice Questions, having each question to be answered by marking the correct answer/s from the choices (commonly four) given against it; such a question paper should be useful in testing the knowledge, analysis, evaluation, skills, application, and the depth of understanding of the students; However, question papers for CIE and SEE shall include not more than 15% of the questions of this type.

(iv) Comprehensive questions have to be answered in detail. These questions are useful in testing the depth of understanding of the subject. These questions shall be related to Theoretical / Practical Knowledge, Problem Solving, Derivations, Applications and Quantitative Evaluation at all levels. The faculty and the External Examiners shall be trained to set the question papers in accordance with Clause 12.2.1.

### **12.3 Examinations / Assessment/ Theory / progressive / viva voce /term work marks shall be as prescribed in the scheme of teaching and examinations.**

12.3.1 Theory marks refers to the marks obtained in a subject in a time bound University examination i.e., SEE. Evaluation in each theory subject shall be conducted by the University, by appointing one Chief Examiner for that subject who shall provide a scheme of valuation. There shall be Moderators and Valuers for each subject under the Chief Examiner. The Valuers will evaluate the answer scripts and these shall be reviewed and moderated by the Moderators on a sample basis. Progressive marks refer to the marks given to a student on a continuous basis during a semester by the concerned subject teacher/teachers.

a) In the case of subjects which are mainly studio based as per the scheme of teaching and examinations, the progressive marks shall be the sum total of marks given to the various

drawings (plates) submitted from time to time by a student on tracing sheets / drawing sheets or Computer printouts/sketches/models on the basis of internal reviews / juries / desk crits. However, if the subject teacher so desires, he/she shall give some weightage for time problems / tests in these subjects. In a semester, two to three such time problems / tests may be conducted.

b) In the case of subjects which are mainly lecture based as per the scheme of teaching and examinations, the progressive marks shall be based on the average of two tests conducted normally at the end of 8th and 12th weeks of each semester. Provided that, the teacher may give assignments instead of tests which may include sketching, book reviews write-ups etc. the progressive marks shall be based on the assignments submitted by the students. A minimum of two assignments per semester shall be given. In all the three cases, viz. studio based, lectured based and practical based subjects:

(i) The concerned teacher shall give a reasonable opportunity to the student to improve his / her progressive marks for example by re-doing the assignments or taking an additional test etc., within the time frame of the given semester.

(ii) The relevant records and submissions of students which have been assessed for progressive marks shall be produced as and when they are sought by the University. Term work examination refers to the examination of the portfolio produced by the student in respect of a subject.. The portfolio shall include all the class work done in the subject during a semester.

10.3.2i) Viva voce marks refer to the marks obtained in the viva voce examinations conducted as per the scheme of teaching & examinations in various subjects. For a viva voce examination, there shall be two examiners, one internal and one external or a teacher who has not taught the subject. The Internal examiner shall be the subject teacher or any other teacher engaged in full time teaching in the concerned college. External examiner shall be a teacher / professional who is not teaching in the concerned college. In all the cases, the evaluation shall be made jointly and one consolidated mark be awarded.

ii) Provided that for the 8th semester viva voce examination, in Architectural Design Project (Thesis), there shall be three examiners one internal and two external. The candidate shall be present in person for these examinations and submit the portfolio of works done during the semester and answer the queries raised by the examiners in respect of portfolio.

12.3.3 The progressive marks awarded to the students in a subject shall be displayed on the notice boards of the colleges to enable the students to point out any discrepancies. The progressive marks finalized shall be signed by the concerned teacher / teachers, Head of the Department on each page and they shall be sent to the University.

12.3.4 If a candidate fails in Professional Training viva voce examination , he/she shall repeat the training afresh in any of the succeeding semesters and appear for the viva voce examination again.

12.3.5. It shall be the responsibility of concerned Head of the Architecture Department / Principal to implement clause. 12.3.4. In the event of an ineligible candidate inadvertently being allowed to appear for the theory / viva voce / term work examination, the result of the concerned examination shall be null and void.

12.3.6 A candidate shall undergo Professional Training in the 9th and 10th semester for a period of 32 weeks under the supervision of a practicing architect registered with the Council of Architecture. A candidate opting to undergo training abroad shall work only under an architect who is a member of the Institute of Architects or appropriate affiliating agency of that country.

The candidate shall submit the logbook, training report and certificate to the effect that he / she has undergone professional training to the Head of the Architecture Department / Principal. He / she shall face a viva voce examination for Professional Training.

12.3.7 If a candidate fails in Professional Training viva voce examination , he/she shall repeat the training afresh in any of the succeeding semesters and appear for the viva voce examination again.

12.3.8 The progressive marks in the case of 8th semester Architectural Design Project (Thesis) shall be based on the evaluation of the project work (Thesis) through internal reviews/juries and desk critics etc., in accordance to the scheme of teaching and examination. Each subject shall have. Internal assessment (Class Marks) marks as mentioned in the Scheme of Study. a) When the I.A marks is 50, 40 marks shall be for work done in the class & 10 marks for a Test. b) When the I.A marks is 100, 80 marks shall be for the work done in the class and 20 marks for a Test.

12.3.9 Eligibility For Taking The Semester Exam: a) The minimum class marks required in each subject is 50% of I.A ,i.e or 25 out of 50 & 50 out of 100 marks to be eligible to appear for the examinations of the Concerned Semester. b) Students who fail to get the minimum I.A marks in any subject are not eligible to appear for the examination and shall repeat the concerned Semester.

#### 12.3.10 Minimum For Pass Declaration And Classification Of Results

a) For a pass in a subject, a candidate shall secure a minimum of 35% of the marks prescribed for a subject in the University examination (Theory, Practical, Drawing, Project work, Viva-Voce etc) and 40% in overall aggregate of marks of all subjects put together

(including class marks or internal assessment, Viva Voce, Practical and theory exam) b) The candidates who fails have to appear in that subject at the University Examination on the next occasion. However, no change in the class marks allotted to the candidate. c) To be eligible for the award of the B.Arch. Degree a candidate shall have passed in all the subjects prescribed for the course.

#### 12.3.12 Promotions and Eligibility for examination:

An academic year consists of odd and even semesters of that year. A candidate is legible for promotion to next academic year (starting with an Odd semesters) provided the candidate has not failed in more than 4 subjects of the two semesters of the just previous academic year and has completed all the examinations lower to the previous year. However, there is total mobility from the Odd to the even semesters of any particular academic year. As an example a candidate seeking eligibility to VII Sem should have passed all the subjects up to and including IV Sem should not have failed in more than 4 subjects of V and VI Semester put together ( Note: any changes to this rule made by University from time to time will be implemented, superseding the earlier regulation.) a Candidates not covered by regulation 12.3.12 are not eligible for promotion till they qualify under regulation 12.3.13 and will be required to discontinue their studies, till they qualify under regulation 12.3.13.

#### 12.3.13 Transfer of Students:

- a. Transfer of students from any University in Karnataka State to this University will be permitted only at the beginning of III Semester or V Semester and not beyond that, and within the quota available.
- b. A candidate seeking transfer from another University under Regulation 10.3.13.a. should have cleared all the subjects of the proceeding years/semesters prescribed by the parent University and produce a certificate to that effect from the University, he or she also need to appear and pass the prescribed subjects under Bangalore university B.Arch. scheme in this syllabus, but which were not taught in the university from where the candidate origin.

### 12.4 Semester End Examination (SEE)

The SEE shall be conducted by the Institution. The Internal / External Examiners, appointed by the respective Board of Examinations, are associated with the work of Question Paper setting/Evaluation/Moderation/Lab Examination /Project Evaluation and others.

- 10.4.1 SEE Answer scripts: The answer scripts of SEE are evaluated/ moderated by the Course Faculty / External Examiner. A committee of the College may oversee and ensure the quality and standard of evaluation and of the grades awarded in all the cases.

- 10.4.2 External Review of SEE: An external review of question papers set shall be done by the Board of Examiners (BOE) of the College by having panel of subject experts from outside the College. To achieve totality in the review of SEE operation, 30% of answer scripts shall be reviewed and then Results / Grades shall be declared. This facilitates in enhancing the confidence level on transparency and fairness of the evaluation system.
- 10.4.3 There shall be a provision for providing photocopy of the answer books for a prescribed fee.

## **12.5 Passing Standards**

The absolute linear grading method is employed for the determination of passing standards. The minimum marks for passing in respect of CIE and SEE for each Course is shown in Table-11.

**Table 11: Passing Marks using Absolute Linear Grading**

<b>Evaluation Method</b>	<b>Passing Marks for Registered course</b>
CIE	$\times 50\%$
SEE	$\times 40\%$
CIE+SEE	$\geq 40 \%$

In case of integrated and comprehensive courses, a student must secure a minimum of 40% marks and 75% attendance in both theory and practical components. In addition, the overall CIE marks including theory, practical and self-study components shall not be less than 40%.

## **12.6 Thesis Evaluation (TE)**

The evaluation of CIE of the shall be based on the progress of the student in the work assigned by the thesis guide, periodically evaluated by the thesis guide at the Department. TE ensures a minimum of three evaluations for CIE: one initial, one mid of semester and one towards the end of semester (before the last working day). Thesis Demonstration/Presentation, Seminar, Submission of Thesis Report and Final Oral Examination shall be conducted by a panel of an Internal and Two External Examiner appointed by the respective BOE.

## **12.7 Electives**

- iv. A candidate shall register for electives in semesters prescribed in the scheme of syllabus from 2 or 3 groups of electives, commencing from VI semester. A minimum of 3 electives will be listed in each group and not more than one to be chosen from each group.

- v. The minimum number of students to be registered for any Elective offered shall not be less than ten.
- vi. A candidate shall opt for his/her choice of electives and register for the same at the beginning of each of VI, VII, and VIII. The candidate is permitted to opt for change of elective within 15 days from the date of commencement of the semester as per the academic calendar.

## **12.8 Successive Failures**

A student who has not been able to obtain eligibility for third semester even after three academic years can re-join B.Arch. Programme in the College as a fresh student to the First Year.

## **13 ATTENDANCE REQUIREMENT**

13.1 All students shall maintain a minimum attendance of 75% in each Course registered. Any student failing to meet the above standard of attendance in any Course(s) registered shall not be allowed to appear for SEE of such Course(s).

13.2 Attendance at CIE and SEE: Attendance at all examinations, both CIE and SEE of each Course registered shall be compulsory for the students and there shall not be any provision for Re-examination.

13.3 Student against whom disciplinary action by the College is pending may not be permitted to attend SEE in that Semester.

13.4 The basis for the computation of the attendance shall be the period prescribed by the College by its calendar of events. For the first semester students, the same is reckoned from the Date of Admission to the Course.

13.5 The students shall take note of his/her attendance status periodically from the respective faculty and strive to make up the shortage. The Departments shall periodically announce the attendance status of the students. Non-receipt of such information from the College shall not be considered as valid reason for exemption from the attendance requirements.

13.6 If a student does not full-fulfill the attendance requirements in any Course, then he / she shall not be permitted to attend the Semester End Examination (SEE) in that Course and is deemed to have been declared “Unsatisfactory” in that Course.

13.7 In respect of Integrated Courses 75% of attendance shall be maintained in theory as well as in practical component of the Course. If he / she fails to maintain the 75%

attendance in any one component, the student shall not be permitted to take up SEE in that Course.

- 13.8 Exemption in attendance shall be given to a student if he/she represents, with prior permission, the University/Institution at the State level / National level / International level technical/cultural/sports events.

## 14 GRADING

### 14.1 General

14.1.1 The grading system has replaced the evaluation of student's performance in a Course based on absolute marks. This is to ensure uniformity in the grading practice at different autonomous Colleges to facilitate the migration of students or transfer of credits among Autonomous Colleges under the Universities.

14.1.2 Letter Grades: The letter grade is basically a qualitative measure (an alphabet/letter) to assess the performance of a student by awarding the following Grades:

- (viii) Outstanding (S)
- (ix) Excellent (A)
- (x) Very Good (B)
- (xi) Good (C)
- (xii) Average (D)
- (xiii) Poor (E)
- (xiv) Fail (F)

The Grades are based on the absolute marks (as in conventional practice) obtained by the student. This is usually arrived at after the student's performance is assessed in a Course that includes both CIE and SEE. To begin with, absolute marks for the total are awarded, followed by grouping of all the students in a Course under different grading levels, as in Table 12.

14.1.3 Absolute Grading: The College / University have adopted the absolute grading system.

### 14.2 Grade Points

12.2.1 The College follows the 10-point grading system, as shown in Table12.

Table 12: Grade Points Scale (Absolute Grading)

Level	Outstanding	Excellent	Very Good	Good	Average	Poor	Fail
Grade	S	A	B	C	D	E	F
Grade Points	10	09	08	07	05	04	00
Marks Range (%)	× 90	× 75 - < 90	× 60 - < 75	× 50 - < 60	× 45 - < 50	× 40 - < 45	< 40

14.2.2 The grade points given in Table 12 help in the computation of credit points earned by the student in a Course. The credit points are equal to the number of credits assigned to the Course multiplied by the grade points awarded to the student in that Course. This shall be used in arriving at the credit index of the student for that semester. The credit index is the sum total of all the credit points earned by the student for all the Courses registered in that semester.

14.2.3 Earning of the Credits: A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade (S, A, B, C, D, E). Letter grade F in any Course implies failure of the student in that Course and with no credits earned.

14.2.4 Transitional Grades: The transitional grades, such as -IØ -WØ -XØ shall be awarded to a student in the following cases. These transitional grades shall be converted into any one of the letter grades (S to F) after the student completes his/her Course requirements, including the Examination.

14.2.4.1 Grade -IØ Grade -IØ is awarded to a student having satisfactory attendance at classes and meeting the passing standard at CIE in a Course, but has had remained absent from SEE for valid and convincing reasons acceptable to the College, under the following circumstances:

Accident or severe illness leading to hospitalization that disables the student from attending Semester End Examination (SEE).

A calamity in the family at the time of SEE that requires the student to be away from the College.

In the event of (a) or (b) above, it is the responsibility of the Student/Parent/Guardian to inform the College authorities (Proctor/Chairperson/Principal) immediately. The information shall be in the form of either written communication, personal communication by parent/guardian/peer or any electronic messages. The candidate needs to submit all the relevant evidences (hospital reports, police reports, certificates from competent authorities, etc.,).

14.2.4.2 Grade -XØ Grade -XØ is awarded to a student having attendance  $\times$ 75% and CIE marks  $\times$  60% in a Course, but SEE performance observed to be poor, that could result in an overall -FØ Grade in the Course. In this case -FØ grade is not awarded but student's performance record is maintained separately. The student shall be provided an opportunity in the Make-up Examination; however, the grades obtained in the Make-up Examination (D, C, B, A, S) shall be reduced to the next lower grade and grade -EØ shall remain unchanged.

14.2.5 Grade -WØ Grade -WØ is awarded to a student having satisfactory attendance and has withdrawn from that Course before the prescribed date in a semester on the recommendation of the faculty. The student shall re-register for the said Course in the regular semesters only. All the -WØ grades awarded to the students shall be eligible for conversion to the appropriate letter grades only after the concerned students re-register for these Courses in regular semesters (Odd / Even) only and fulfil the passing standards. The students who have been awarded grade -WØ are not eligible to register for a course in the Fast Track Semester.

14.2.6 Grade -UØ A student is awarded grade -UØ in a course if the student has registered for that course for audit only, provided that the student satisfies the attendance requirements as stipulated in Section 13. This grade would carry no grade points and is not used in the computation of SGPA or CGPA.

14.2.7 Grade Card: Each student shall be issued a Grade Card at the end of each semester. This shall have a list of all Courses registered by a student in the semester along with the credits. In addition to the letter grades with grade points, the grade card shall contain transitional grades 'T', -WØ and 'X' that does not carry any grade points. Hence, only the Courses registered for credit and having grade points shall be included in the computation of SGPA and CGPA. The grade card of a semester shall contain the total credits earned till that semester.

14.2.7.1 However, the Courses taken for audit shall not form part of this computation. The results of Mandatory Courses that are of the non-credit type shall also be reflected in the Grade Card as 'PP' (for Passed) or 'NP' (for Not Passed). It may be noted that every student shall have to obtain the grade 'PP' in each Mandatory non Credit Course to qualify for award of the Degree by the University.

14.2.8 Make-up Examination: The Make-up Examination facility shall be available to students who have missed the SEE of one or more Courses in a semester for valid reasons and have obtained the grade 'T'. Students having the 'X' grade shall also be eligible to take advantage of this facility. The standard of the Make-up Examination shall be the same as that of regular SEE for the Courses. The Make-up Examination shall be held as per dates notified in the Academic Calendar.

14.2.9 In the event, a student fails in a Laboratory Course/Project and/or CIE of a course in the final year, the student shall be given grade 'T' for the Course(s). In such a case, the Institution may grant the student extra time not exceeding 12 weeks for completing the Course with due concurrence of the faculty and Chairperson of the Department. If no such extra time is sought/granted, the concerned student shall have to re-register for the Course(s) in the succeeding regular semester and fulfil the academic requirements for award of the Degree.

14.2.10 All the transitional grades ('T' and 'X') awarded to a student shall have to be converted to an appropriate letter grade after the make-up Examinations. Any outstanding 'T' and 'X' grades two days after the last scheduled Make-up Examinations shall be converted to 'F' grade automatically.

### **14.3 Grade Point Averages**

14.3.1 SGPA and CGPA: The credit index is used for computing the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA).

SGPA is equal to the credit index for a semester divided by the total number of credits registered by the student in that semester. CGPA is the sum total of credit indices of all the previous semesters, including the current semester, divided by the total number of credits registered in all these semesters.

The SGPA and CGPA shall be computed as shown below:

#### **Semester Grade Point Average (SGPA)**

The SGPA is the ratio of sum of the product of the number of credits with the corresponding grade points scored by a student in all the courses taken by a student **to** the sum of the number of credits of all the courses undergone by the student in that semester, i.e.,

$$\hat{U} [(Course\ credits) \times (Grade\ points)]$$

(for all Courses in that semester under consideration excluding transitional grades)

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$$\hat{U} [(Course\ credits)]$$

(for all Courses in that semester under consideration excluding transitional grades)

#### **Cumulative Grade Point Average (CGPA)**

The CGPA is also calculated in the same manner as that of SGPA taking into account all the courses undergone by a student over all the completed semesters of a Programme including the current semester, i.e.,

$$\hat{U} [(Course\ credits) \times (Grade\ points)]$$

(for all Courses excluding those with F and transitional grades of semesters under consideration)

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$$\hat{U} [(Course\ credits)]$$

(for all Courses excluding those with F and transitional grades of semesters under consideration)

SGPA and CGPA facilitate the declaration of academic performance of a student, at the end of a semester and at the end of successive semesters respectively. SGPA and CGPA shall be normally calculated up to the second decimal position, so that the CGPA, in particular, can be made use of

in ranking the students in a class. If two students get the same CGPA, the tie should be resolved by considering the number of times a student has obtained higher SGPA. If it is not resolved even at this stage, the number of times a student has obtained higher grades like S, A, B etc., shall be taken into account in ranking the students in a class.

12.3.2 An illustrative example given in Table-13 indicates the computation of SGPA and CGPA as in Section 12.3:

**Table 13: Typical example - Calculation of SGPA/CGPA**

Semester (Odd:I) (Even:II)	Course No.	Credits	Grade	Grade Points	Credit Points	SGPA	CGPA
I	101	1	S	10	10		
I	102	1.5	F	0	00		
I	103	3	A	9	27		
I	104	4	B	8	32		
I	105	3	W	-	-		
<b>Total</b>		9.5 (8*)			69	7.26 (69/9.5)	7.26 (69/9.5)
II	107	3	C	7	21		
II	108	4	B	8	32		
II	109	3	D	5	15		
II	110	1.5	E	4	06		
II	111	1	F	0	00		
<b>Total</b>		12.5 (11.5*)			74	5.92 (74/12.5)	6.50 (143/22)
Fast Track	102	1.5	B	8	12		
Fast Track	105	3	C	7	21		
Fast Track	111	1	D	5	5		
<b>Total</b>		5.5			38	6.91 (38/5.5)	6.58 (181/27.5)

\*Total No. of credits excluding those with 'F' and transitional grades. This is particularly important to keep track of the number of credits earned by a student up to a semester under consideration.

#### **14.4. Vertical Progression**

Minimum score for SGPA and CGPA with the minimum number of credits are prescribed for the vertical progression of students. This facilitates the mobility of students from one College to another. The vertical progression of students is applied between two academic years only.

The following are the prescribed scores for vertical progression:

- e) Minimum Score for SGPA = 5.0
- f) Minimum Score for CGPA = 5.0 (at the end of each academic year)
- g) Maximum number of F Grades that can be carried at the end of any academic year is four.
- h) The maximum number of withdrawals at any given time shall not exceed two courses subject to maintaining the minimum registration requirements.

However, failure to secure a minimum CGPA = 5.0 at the end of any semester for the first time, shall attract a warning before allowing the student to continue in the next semester.

#### **14.5 Award of Class:**

The class shall be awarded after the student earn a total of 175 credits. Table 14 shows the mapping of the range of percentage marks, the range of Grade Point Average and the award of class.

Table 14: Award of Class

Percentage of Marks	Range of Grade Point Average (SGPA or CGPA)	Class
× 40 and < 50	5 OCGPA < 5.75	Pass Class(PC)
× 50 and < 60	× 5.75 and < 6.75	Second Class(SC)
× 60 and < 70	× 6.75 and < 7.75	First Class(FC)
× 70	× 7.75	First Class with Distinction(FCD)

Note: The percentage of marks for a given SGPA/CGPA can be computed using the formula: % Marks Scored = [CGPA ÷ 0.75] X 10

#### **14.6 Graduation Ceremony**

14.6.1 The college will organize annual Graduation Day ceremony for the award of Degrees to students completing the prescribed academic requirements.

14.6.2 The College awardsRanks and Medals to the meritorious students during the Graduation Day Ceremony to encourage the students to strive for excellence.

## **15. OTHER ACADEMIC MATTERS**

### **a. Academic Schedules**

The Academic Calendar is published before the commencement of every academic year to assist the students and faculty. The Calendar includes, dates for registration of Courses, dropping of Courses, withdrawal from Courses, etc. This enables the students to minimize their chances of failure in CIE and/or SEE and take full advantage of the flexibility provided by the CBCS.

### **b. Registration of Courses**

Each student shall have to register for Course work at the beginning of a semester as prescribed in the academic calendar. The student has to compulsorily register for all the stipulated credits in the first year of the Programme. From third semester onwards the registrations shall be within the limits of minimum ( $\times 18$ ) and maximum ( $\times 26$ ) credits. The students may seek faculty advice and discuss with the proctor/faculty prior to registration of Courses.

### **f. Dropping of Courses**

A specific period in the middle of a semester is fixed for this purpose and to help review the student's performance in CIE by the faculty advisors (proctors). The students having poor performance have the option to drop the identified Course(s) up to the minimum credits specified for the semester. The dropped courses shall not be mentioned in the Grade Card. Such Courses have to be re-registered by these students in the regular semesters at a later time. However, the students are not allowed to drop any courses in first and second semester.

### **g. Withdrawal from Courses**

A specific period is identified towards the end of a semester to help review the students' performance in CIE Department council .Department council shall advise the students having poor performance to withdraw from identified Course(s) (up to the minimum credits specified for the semester) with a mention in the Grade Card 'W'. Such Courses have to be re-registered by these students in the main/regular semesters at a later time.

#### **(i) When to withdraw?**

A student is allowed to withdraw from a Course(s) before one week counted from the last date of the second internal test (CIE) or as mentioned in the Academic Calendar.

(ii) Separate circular/notification shall not be issued in this regard. It is the responsibility of the student to withdraw from the Courses within the stipulated time failing which the student shall continue with the Course and fulfil the academic requirements.

**h. Temporary withdrawal from Programme**

(i) A student may withdraw temporarily from the Programme on grounds like, prolonged illness, grave calamity in the family or any other serious circumstances. The withdrawal shall be for periods which are integral multiples of a semester, provided that:

(a) The student shall apply to the College within six weeks from the commencement of the semester or the date he/she last attended the classes, (whichever is later) stating fully the reasons for such a withdrawal, together with supporting documents and endorsement of his/her parent/guardian.

(b) The College is satisfied about the genuineness of the case and by taking into account the expected period of withdrawal, the student has the option to complete the Programme requirements within the time limits specified by the College/University.

(c) The student does not have any dues or demands at the College/University including tuition fee, hostel, library, laboratory and other dues.

(iv) A student availing of temporary withdrawal from the College under the above provision shall be required to pay such fees and/or charges as may be fixed by the College until such time as his/her name appears on the Students' Roll List. However, it may be noted that the fees/charges once paid shall not be refunded under any circumstances.

(v) Normally, a student shall be entitled to avail the temporary withdrawal facility only once during his/her studentship of the Programme. However, any other concession, including multiple withdrawals, for the concerned student shall have to be approved by the Academic Council of the College on the recommendation of the Principal.

**g. Termination from the Programme**

A student shall be terminated from the Programme and leave the College on the following grounds:

(i) Failure (getting F Grade) in any Course in spite of five attempts.

- (ii) Failure to secure a CGPA  $\times$  5.00 on three consecutive occasions (However, failure to secure a CGPA  $\times$  5.00 at the end of any semester for the first time attracts warning before approval of the student to continue in the following semester).
- (iii) Absence from classes for Two consecutive semesters (Odd and Even) at a time without leave of absence being granted by competent authorities.
- (iv) Failure to meet the standards of discipline as prescribed by the College / University from time to time.
- (v) Successive Failures: A student who has not been able to obtain eligibility for third semester even after three academic years shall be terminated from the program. However, such a student can re-join the B.Arch. Programme in the College as a fresh student to the First year.

#### **j. Student's Feedback**

- (i) The College shall obtain feedback from the students on their Course Work and various academic activities. The feedback is obtained from the students at regular intervals, as decided by the College/University, maintaining confidentiality.
- (ii) The feedback received from the students shall be reviewed by a committee constituted for the said purpose and necessary corrective measures shall be initiated.
- k. Suitable assessment tools and processes shall be incorporated for evaluation of course outcomes, program outcomes and program specific outcomes through direct and indirect methods required for accreditation of programmes by NBA.
- l. To facilitate industry interaction, a minimum of 3 guest lectures from industry, R & D organizations shall be arranged in every semester.

### **16. AWARD OF PRIZES, MEDALS & RANKS**

For the award of Prizes and Medals, the conditions stipulated by the Donor shall be considered as per the statutes framed by the College/University for such awards.

### **17. CONDUCT AND DISCIPLINE**

17.1 Students shall conduct themselves within and outside the College campus in a manner befitting the students of an Institution of National Importance.

17.2 As per the order of Honourable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.

17.3 The following acts of omission/ or commission shall constitute gross violation of the Code of Conduct and are liable to invoke disciplinary measures:

- m) Ragging
- n) Lack of courtesy and decorum; indecent behaviour anywhere within or outside the campus
- o) Wilful damage or stealthy removal of any property/belongings of the College/Hostel or of fellow students/citizens.
- p) Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.
- q) Mutilation or unauthorized possession of Library books.
- r) Noisy unseemly behaviour and disturbing studies of fellow students.
- s) Hacking in computer systems (such as entering into other person's area without prior permission, manipulation and / or any other Cyber crime etc.)
- t) Plagiarism of any nature.
- u) Any other act of gross indiscipline as decided by the College/University from time to time.
- v) Use of mobile in the college academic area.
- w) Smoking in college Campus and tobacco chewing.
- x) Unauthorized fund raising and promoting sales.

Commensurate with the gravity of offence the punishment may be: reprimand, expulsion from the hostel, debarring from an examination, disallowing the use of certain facilities of the college, rustication for a specified period or even outright expulsion from the college, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.

15.4 For an offence committed in (i) hostel (ii) department or in a class room and (iii) elsewhere, the chief warden, the Head of the Department and the Dean (Academics), respectively, shall have the authority to reprimand or impose fine.

15.5 All cases involving punishment other than reprimand shall be reported to the Principal.

15.6 Cases of adoption of unfair means and/ or any malpractice in an examination shall be reported to the Registrar (Evaluation) for taking appropriate action.

## **18. INTERPRETATION**

18.1. Any question that arises as to the interpretation of these rules and regulations shall be decided by the College / University, whose decision shall be final and binding on the student in the matter. The College / University shall also have the power to issue clarifications to remove any doubt, difficulty or anomaly, which may arise in regard to the implementation of these regulations.

18.2. Academic rules and regulations of CBCS may be altered/changed from time to time by the academic council of the College / University.

18.3. Failure to read and understand Academic rules and regulations of CBCS is not an excuse. (Ignorant juries non excusal)

**TENTATIVE CALENDAR OF EVENTS FOR THE ACADEMIC YEAR 2018-2019\***

Sl. No.	EVENT	DATE(S)
1	Arrival day, visit to the Departments and Course registration for first semester	01.08.2018
2	Inauguration of first year classes 2018-19	02.08.2018
3	Course Registration for higher semesters	03.08.2018 & 04.08.2018
4	Induction/Orientation Programme for first year students	03.08.2018 & 04.08.2018
5	Commencement of Classes for the Odd semester 2018-19	05.08.2018
6	Dropping of Course	On or before 19.08.2018
7	Quiz#1	To be conducted before Test#1
8	Test#1	07.09.2018 to 09.09.2018
9	Quiz#2	To be conducted before Test#2
10	Test#2	08.10.2018 to 10.10.2018
11	Last date for Withdrawal	26.10.2018
12	Test#3	16.11.2018 to 18.11.2018
13	Last working day for the ODD Semester	25.11.2018
14	SEMESTER END EXAMINATION	07.12.2018 to 19.12.2018
15	Make up Examination	04.01.2019 to 11.01.2019
16	Vacation for Students and Teachers	20.12.2018 to 07.01.2019
17	Course registration for EVEN SEMESTER	08.01.2019 & 09.01.2019
18	Commencement of classes for the Even Semester 2018-19	11.01.2019
19	Dropping of Course	23.01.2019
20	Quiz#1	To be conducted before Test#1
21	Test#1	15.02.2019 to 17.02.2019
22	Quiz#2	To be conducted before Test#2
23	Test#2	24.03.2019 to 26.03.2019
24	Last date for Withdrawal	2.04.2019
25	Test#3	14.04.2019 to 16.04.2019
26	Last working day	21.04.2019
27	SEMESTER END EXAMINATION	02.05.2019 to 18.05.2019
28	Make up Examination	01.06.2019 to 11.06.2019
29	Vacation for students and Teachers	20.05.2019 to 30.07.2019
30	FAST TRACK SEMESTER	13.06.2019 to 30.07.2019

Note: Vacation for teachers shall be declared by College / University.

\*The calendar of events shall be announced at the start of odd semester every year for I/II Semester and III to VIII Semester, separately.

**DETAILED SYLLABUS CONTENT FOR I SEMESTER**  
**B.Arch.2018**

## **18ARCH101- ARCHITECTURAL DESIGN -I**

**CONTACT PERIODS PER WEEK: 9 HOURS (STUDIO)**

**EXAM DURATION: - VIVA**

**CLASS MARKS: 200**

**VIVA MARKS : 200**

**Total : 400**

**Credit: 09**

### **OBJECTIVE:**

To develop an understanding of principles of design in abstract.

### **OUT COME:**

To train the eye and hand in architectural perception leading to development of a series of compositions eventually terminating in design.

### **OUTLINE:**

1. Understanding of elements of design like Line, form shape, Texture & space.
2. Application of design elements to formulate two and three dimensional compositions in abstract.
3. Typography and letterings as important design elements. Compositions, lettering sheets / plates, letterhead design visiting cards, posters, invitations, symbols & icons
4. Visual analyses of built forms in terms of structures/Skeleton. Enclosure/skin and shape/ form relating to solids and voids. Expression of the analyzed built form in orthographic projection
5. Study of basic human anthropometrics, average measurements of human body & its proportions understanding the design of basic furniture used through measure drawing of the same.
6. Basic human activities and related spatial requirements, relating to minimum and optimum areas for mono functions. Example- living room or kitchen or bedroom etc,
7. Multifunctional activities likely to be performed in a given space and their sequence, spatial requirements furniture required, light and ventilation required for the performance of the above dimensional studies.
8. Three dimensional expressions through measured drawings(Plan, elevation, section and isometric drawings) of mono functions combining abstraction and function relating the examples like gate. Entrance arch telephone kiosk, security cabin milk bath vegetable kiosk, Bus shetter or ice cream or magazine kiosk etc to be explored. The emphasis shall be on FORM generation

**NOTE :-** That the types of projects mentioned above are only suggestive / indicative in nature. The Design teacher is at liberty to select and adopt any subject of similar nature and scale to fulfil the syllabus objective

### **REFERENCE BOOK:**

1. öTime Saver Standards for Architectural Design Dataö by John Hanock, 1982
2. öArchitectural Graphic Standardsö by Ramsay and Sleeper, 2017

## **18ARCH102- BUILDING CONSTRUCTION & MATERIALS-I**

**CONTACT PERIODS PER WEEK: 6 HOURS**

**EXAM DURATION: - 4 Hours**

**CLASS MARKS:100**

**THEORY EXAM MARKS : 100**

**Total : 200**

**Credit: 07**

### **OBJECTIVE:**

To give an introduction to building elements and contemporary local construction methods and materials.

### **OUT COME:**

Traditional and conventional knowledge systems that enable construction of a complete building

### **OUTLINE:**

- 1) Making of Buildings ó Overview & Knowhow of Building Materials & Construction Systems.
- 2) Understanding Drawing Conventions used for drawing Plan, Section & Elevation.
- 3) Brick Masonry ó Types of Bricks, Manufacturing, Properties, Bonds and types of walls.
- 4) Stone Masonry ó Introduction, Types, Quarrying, Properties, types of walls.
- 5) Contemporary / Alternative Wall Construction ó Concrete Blocks, Stabilized Mud Blocks and Aerated Concrete Blocks.
- 6) Masonry Foundation for Load Bearing Walls ó Stone and Brick.
- 7) Introduction to Timber/ Wood, Seasoning and Quality of Timber.
- 8) Wooden Doors ó Battened, Ledged, Braced, Framed, Panelled, Flush and Glazed.
- 9) Wooden Windows ó Casement, Sash & Glazed and Bay Window & Corner Window.
- 10) Study of Joinery and Carpentry Details.

### **Materials: -**

Introduction to Wood as a Building Material, Properties, Seasoning, Preservation etc.,

Bricks ó Types, properties, uses and manufacturing methods.

Stones ó Types, properties and uses, quarrying

Lime- Varieties, properties and uses in building

Lime Mortar ó Preparation and application

Sand ó Availability, properties, type of sand to be used in construction

Aggregate ó Sources and types, sizes, purpose of use eg: structural, non-structural

Concrete Blocks ó Types, sizes, qualities and manufacturing process in brief

**Term Work: -**

- (iii) Minimum of Ten Plates to Cover the above topics
- (iv) Site Visits and Study Models to be Encouraged.
- (v) Material and Literature Portfolio on Topics where needed.

**REFERENCE BOOKS:**

1. "Building Construction" by W.B.Mackay, 2012
2. "Construction Technology" by Greeno&Chudley. 1973
3. "Construction of Buildings" by Barry,2005
4. "Building construction" by Francis. K. Ching, 2014

## **18AREN103 -STRUCTURES FOR ARCHITECTURE-II**

**CONTACT PERIODS PER WEEK: 3 HOURS (3LECTURE)**

**EXAM DURATION: - 3 HOURS**

**CLASS MARKS: 50**

**THEORY MARKS: 100**

**TOTAL: 150**

**Credit: 02**

### **OBJECTIVE:**

To give an introduction to structural details for the successful completion of a project .

### **OUT COME:**

Understanding the structural concepts and behavior of structural elements, using various systems and relating the knowledge acquired to architectural design.

### **OUT LINE:**

#### **PART – A**

1. Introduction concept of force- concept of particle and rigid body-principle of Transmissibility of a force-system of forces-free body diagrams-accuracy of Calculation.
2. Coplanar Concurrent force system: Resultant of the system Concept of force polygon & fascicular polygon.
3. Coplanar Analytical and graphical methods non-concurrent force systems. Moment of a force, equations of equilibrium, couple, Resultant of the system conditions of equilibrium determination of reactions in statically determinate beams subjected to various types of loads.

#### **PART – B**

4. Trusses: Analysis of plane project trusses by the method of joints and method of sections
5. Cancroids and second moment of areas: Radius of gyration of plane figures and built up sections polar moment of inertia, significance product of inertia.
6. Friction: Laws of friction for dry surfaces (simple examples) wedges friction inclined plane.

**NOTE:** In the examination one question is compulsory of all chapters and FOUR questions have to be set from each part and the student has to answer FIVE questions by selecting TWO from each part.

öTHE SUBJECT HAS TO BE TAUGHT BY THE CIVIL ENGG. FACULTYö

**TEXT BOOK:** Engineering Mechanics Dr. S.S. BhaviKatti

**Term Work:** - Minimum of two tests to be conducted during the semester

**REFERENCE:**

1. Engineering Mechanics Ferdinand singer, mar per & Row Publisher, 2011
2. Mechanics for Engineers ó Static & Dynamics Ferdinand P Beor, latest edition, 2011
3. Engineers Mechanics Vol 1 & 2, J.L Meriam & L.G Kraige, Hohnwiley and sons, 2013
4. Engineering Mechanicsó Static & Dynamics II Edn. ( St. Version), I.H Shyames, Prentice Hill of India. 2012

## **18ARCH104- HISTORY OF ARCHITECTURE-I**

**CONTACT PERIODS PER WEEK: 3 HOURS**

**EXAM DURATION: - 3 Hours**

**CLASS MARKS: 50**

**THEORY MARKS: 100**

**TOTAL: 150**

**Credit: 02**

### **OBJECTIVE:**

Architecture is the product of social, cultural religious, and political forces, Great cultures and civilizations have existed all over the world the world, producing not only great monuments but robust vernacular architectural traditions, closely tied to the environment and their local contact, which resonate even today. This course traces the early efforts in the development of build environment.

### **OUTCOMES:**

Architecture as evolving within specific cultural contexts including aspects of politics, society , religion, climate, geography and geology.

**OUTLINE:** Introduction Historic courses to Architecture students: Lecture and discussion on

- 1 What History education entails 2) Architecture's connection with History
- 2 Introduction to Pre-Historic Civilization: Primitive man ó shelters, settlements, religious and burial systems  
E.g: Oval hut, Nice, Dolmen tomb, gallery grave, passage grave, Houses at CatalHuyuk, Henge Monuments, Stone Henge
- 3 Introduction to River valley cultures: Forces shaping settlements and habitats: Ex Water, building material, governance etc., their continued relevance in today's context
- 4 Indus Valley Civilization: Forces shaping settlements and habitats: ex. Water building material, governance, etc., Layout of Mohenjodaro, House plan, Community well, Great Bath, construction techniques
- 5 River valley cultures, Tigris and Euphrates: Ziggurats at Warka , Ur and TchogaZambil, Palace of Sargon. Construction and decorative applications
- 6 River valley cultures, Nile: Mastaba Tombs, Pyramind of Cheops, Temple of Khons, Karnak
- 7 Introduction to Chinese Architecture: Forces shaping settlements and habitats: build types and construction techniques.
- 8 Introduction to Mayan and Japanese Architecture: Forces shaping settlements and habitats ó building types/needs, construction materials and methods.
- 9 Introduction to Desert and Mountainous cultures: Forces shaping settlements and habitats-winds, heat, slopes, extremes of climate, remoteness and settlement size and shape.

10 Introduction to Tribal Culture: Todas(Nilgiris) Santals (M.P) General; characteristics and spatial & habitat studies  
Introduction to contemporary Tribal Cultures:

Note Term Work: -

Course work submission to include:

1. Sketch book portfolio
2. Documentation of local sites of interest (where available)
3. Study models to understand spatial aspects ex: placement hierarchy,  
Movement pattern, functional aspects etc.,

**REFERENCE S:**

1. History of Architecture in India by Tadgell Christopher,1990
2. Indian Architecture, Buddhist and Hindu period by Brown Percy,1942
3. Architecture of India, Buddhist and Hindu by Grover, Satish, latest
4. A History of Architecture by Bannister Fletcher.1996

## **18ARCH105- WORK SHOP (ARCHITECTURAL MODEL MAKING)**

**CONTACT PERIODS PER WEEK: 3 HOURS (STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS: 100**

**THEORY MARKS : NIL**

**Total : 100**

**CREDIT: 02**

### **OBJECTIVE:**

To develop the ability to use physical models to conceive, organize and develop habitable three-dimensional space and to develop the ability to appreciate the 3D implication of design and to introduce the students to the techniques of model making.

### **OUTCOME:**

Through physical model projects of varied scale and increasing complexity, students will address fundamental lessons of geometry, proportion and scale by making of 3D forms such as cubes, pyramids, cones etc. using different types of materials such as paper, card board, mount board, balsa wood, wax, plaster of paris etc.

### **OUT LINE**

- 1) Architectural models i) the purpose and necessity, introduction to model making materials eg paper, boards, wood, plaster of paris was, soap etc ii) tools required eg cutters, knife, blade, sand paper iii) cutting and joining details in different materials.
- 2) Idea of types of models and their use. Site model, contour model, block model, detailed model, sectional model, structural model etc. demonstration through exhibits /models-portfolio
- 3) Idea of accessories, trees, vehicles, people, rocks, water body etc to generate appropriate sense of scale.
- 4) Site model A) contour studies to study slopes, views, drainage, steepness of slope and methods of tackling them.
- 5) Site model B) Large scale model eg. A campus to understand representation of various elements to a scale of 1:500 or 1:1000
- 6) Site model C) Study of single unit eg: A single unit type like an artist studio a bachelors unit etc and elements to be shown on site model like road, pathway, fence, gate, trees, vehicle, parking, water body etc to a scale of 1:50
- 7) Block model :idea and necessity, emphasis on features like doors, windows
- 8) Sectional model: applied to the solid block model detachable/removable roof to see plan and cut superstructure to understand spaces in section, scale 1:50

- 9) Detalstudeis: study of roof, staircase, a single room eg:bed room, living room etc, to a larger scale, window of different types, railings-all as applicable to the model already worked up on.
- 10) Accessories to detail:representinbe tress eg: coir , cotton, foam, twings,paperetc/bush,thermoschle, globule, lawn, sand ( Sand paper), rocks ( pebbles) fences, walls , gate, water body ) glass, plastic, paint etc) pavement/paving, edges, furniture seats, light poles, railings, regaining wall etc, as also vehicles
- 11) A block model of a small neighbor hood ( residential) to understand hierarchy of space and to incorporate most of the above said aspects.
- 12) Experimental model making eg: structural study model, modular concept ( whereelemets can be added or removed/dcaling up or scaling down idea) composite-model ( use of different materials in the same model, pop-up/Donw models, walk through models etc-essentially experimental in nature- even full scale experiments of manageable size can be taken up.

**NOTE:- assignments to be done individually as suggested in each module during the semester.**

## **18ARHU106- COMMUNICATION SKILLS**

**CONTACT PERIODS PER WEEK: 3 HOURS (STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS: 50**

**THEORY MARKS : NIL**

**Total : 50**

**Credit: 02**

### **OBJECTIVE:**

To develop skills in effective communication both written and verbal.

### **OUT COME:**

Confident student who can face a client professionally.

### **OUTLINE:**

Understanding the difference among seminars conferences, convention, congress, debates, extempore speeches, panel discussions etc, verbal presentations on architectural types.

Simple grammar ó using appropriate words, filling of blanks, completing of sentences, active passive voice, correcting mistakes in texts, Use of proverbs, metaphors., Reading and listening comprehension, to develop the ability to read and listen with understanding and draw reasoned conclusions, précis writing book review.

Interpretation of materials such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.

Notes taking from spoken and written English

Comprehension of lectures and speeches to locate key points.

Writing To develop the ability to write concisely and correctly and correctly and present ideas if a logical manner.

Professional letters to fellow architects, clients public authorities, contractors, enquiries to industries, dealers,

Essay writing on current political, technical and social problems, Types of Essay ó Argumentative, descriptive.

Resume Preparation, Presentation/Public speaking-Use of Black board, Whiteboard, charts and digital media,

Preparation of Technical reports,

**NOTE: - That the types of projects mentioned above are only suggestive / indicative in nature. The Design teachers is at liberty to select and adopt any subject of similar nature and scale to fulfill the syllabus**

**TERM WORK:** Exercises related to the above topic

### **REFRRENCE BOOKS:**

1. Working in English: Teachers Book, Jones Leo, 2001
2. Communicative English for Professional courses, Mudambadithaya G.S, 2014
3. English conversation Practice Taylor Grant, 2001

## **18ARCH107-ARCHITECTURAL GRAPHICS-I**

**CONTACT PERIODS PER WEEK: 3 HOURS (1 LECTURE+2STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS:100**

**EXAM MARKS: NIL**

**Total : 100**

**CREDIT:02**

### **OBJECTIVE:**

To introduce the students to the fundamental techniques of architectural drawing.

### **OUT COME:**

Understanding of Graphic design elements, principles and applications, concept of form and space.

### **OUTLINE:**

Introduction to the basic principles of drawing, sign conventions, Practice in lettering, lettering used in architectural drawings, including different fonts, introduction to plane geometry and exercises in lines and angles, construction of triangles, quadrilaterals and regular polygons, construction of plane curves, ellipse, parabola, hyperbola and ovals, arches, typical arch forms and methods of drawing them. Scales, construction of plain and diagonal scales and their uses in practice. Orthographic projection (first angle projection). Principles of orthographic projection, projection of points, lines, planes, solids. Three dimensional representations, isometric and axonometric projection of solids.

- Section of solids, true shapes of sections.
- Development of surfaces
- Interpenetration of geometric solids, prism with prism cylinder with cylinder, cone with cylinder, cylinder with prism etc.

**Term Work:** - Plates on each of the above topics shall be presented for Viva examination.

### **REFERENCE BOOK:**

1. "Engineering drawing" by ND Bhat, 2014
2. "Geometrical Drawing for Arts Students" by IH Morris, 2017
3. "Engineering drawing Vol I and II" by KR Gopalakrishna, 2012
4. "Architectural Graphics" by Frank K. Ching, 1975

## **18ARAR108-VISUAL ARTS & Basic Design-I**

**CONTACT PERIODS PER WEEK: 6 HOURS (1LECTURE+ 5STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS: 100**

**EXAM MARKS: NIL**

**TOTAL: 100**

**CREDIT:02**

### **OBJECTIVE:**

To develop good hand-eye visualization skills through drawing/sketching skills to enable to make their transition from science background to design skills

### **OUT COME:**

Confident student who can face a client professionally.

### **OUTLINE:**

1. Freehand drawing ó Use of various drawing and sketching tools like pencils, ink pens, charcoal pencils etc., exercises in free hand drawing of household furniture, street furniture, human beings, cars, trees etc.,

2. Painting ó Use of painting tools and materials like easels, brushes, paper, water Color, poster color etc., color theory, color wheel, Primary, secondary and tertiary colors, color schemes, exercises in understanding of color value and intensity.

**3. Understanding design principles Viz contrast harmony, Rhythm, Proportion and unity through the use of elements like lines, forms, shapes textures etc, in tow dimensional exercise.**

**4. Extension of exploration of the above said principles in three dimensional sculptural studies in different media- clay, plaster of paris, wood, wire paper and any other media.**

**Term Work: - Define Exercises as defined above in the form of Portfolio + Photographs**

### **REFERENCE BOOK:**

óRendering with Pen and Inkö by Robert Gill, 2012

óPrinciples of three dimensional compositionö -  
Wucious Wong 1977

**DETAILED SYLLABUS CONTENT FOR II SEMESTER**  
**B.Arch.2018**

## **18ARCH201- ARCHITECTURAL DESIGN -II**

**CONTACT PERIODS PER WEEK: 9 HOURS (3 LECTURE+6 STUDIO)**

**EXAM DURATION: - VIVA**

**CLASS MARKS: 200**

**VIVA MARKS: 200**

**TOTAL: 400**

**CREDIT:09**

### **OBJECTIVE:**

To develop the ability to functional issues and transform them in to perceptible aesthetical forms through the application of principles of design. The result should integrate space & form, movement, transformation, scale structure in realizing architectural expression.

### **OUT COME:**

To train the student in identifying functionality of the form and spaces in architectural perception leading to development of a series of compositions eventually terminating in design.

### **OUTLINE:**

- a. Space defining aspects of walls, floors, Roof plans, openings.( Solids & Voids) and structural elements to be explored in general functional aspect. (not mandatory)
- b. Functional context to be specified in space making using elements like walls, roofs, column, level difference, colours, texture, materials & scale; both individually and in combination drawing in plan & elevations
- c. Extension of the above integrated aspects & their adoption to learning specs examples Nursery/ Kindergarten, schools Play area library in a kindergarde, eating areas, Example; Durshini restaurant, chat & juice centre, café commercial spaces eg; Bank extension counter, book shop, Photo studio etc, Postal facility/ courier facility residential spaces eg; Bachelors pad or studio apartment small office space  
eg : Doctor's clinic, lawyer's office, Architect's office, Travel agency etc.,

Models & Sketches along with analysis are to be highly encouraged as means of idea development.

**NOTE :-** That the types of projects mentioned above are only suggestive / indicative in nature. The Design teacher is at liberty to select and adopt any subject of similar nature and scale to fulfill the syllabus objective

**TERM WORK:** 1) Two Major Projects

2) Two Minor Exercises

### **REFERENCE BOOK:**

1. "Time Saver Standards for Architectural Design Data" by John Hanock, 1982
2. "Architectural Graphic Standards" by Ramsay and Sleeper, 2017

## **18ARCH202- BUILDING CONSTRUCTION & MATERIALS -II**

**CONTACT PERIODS PER WEEK: 6 HOURS**

**EXAM DURATION: - 4 Hours**

**CLASS MARKS: 100**

**THEORY EXAM MARKS: 100**

**TOTAL : 200**

**CREDIT:07**

### **OBJECTIVE:** -

To acquaint the students to Roofing Systems, Connecting Systems (Stair Cases), Enabling Structures (Formwork) and Introduction to Cement, Steel and Concrete and RCC Foundations.

### **OUT COME:**

Traditional and conventional knowledge systems that enable construction of a complete building

### **OUTLINE:** -

- 1) Timber Roof ó Introduction, types, various parts and Purposes with detailed Drawing of two Roof Systems like King Post and Queen Post.
- 2) Introduction to Cement and Steel as a Building material, types, properties, Reinforced Cement Concrete as a Building Material, grades and properties.
- 3) Formwork, Placing, Compacting and Curing of Concrete.
- 4) Introduction to Staircase, Anthropometry and Geometrical types.
- 5) Introduction to Timber Stairs and description of types.
- 6) Detailed Drawing of Housed String Stairs.
- 7) Detailed Drawing of Cut String Stairs.
- 8) Principles and Methods of construction of RCC Foundations ó Understanding Safe Bearing Capacity, Hardness of Soil, Live Loads and Dead Loads.
- 9) Detailed Study of Isolated and Combined Footing.
- 10) Other RCC Foundations like Raft and Grillage Foundation.

### **Material –**

Timber ó prerequisites for Roofing Elements and behavioral properties under loading conditions. Application of non-ferrous metals and glass.

Cement ó Types of cement, their applications, manufacturing process, laboratory and field tests.

**Term Work: -**

- 1) Minimum Ten Plates to Cover the above.
- 2) Site Visits and Study Models to be encouraged.
- 3) Material and Literature Portfolio on Topics where needed.

**REFERENCE BOOKS:**

1. "Building Construction" by W.B.Mackay, 2012
2. "Construction Technology" by Greeno&Chudley. 1973
3. "Construction of Buildings" by Barry,2005
4. "Building construction" by Francis. K. Ching, 2014

## **18AREN203 -STRUCTURES FOR ARCHITECTURE-II**

**CONTACT PERIODS PER WEEK: 3 HOURS (3LECTURE)**

**EXAM DURATION: - 3 HOURS**

**CLASS MARKS: 50**

**THEORY MARKS: 100**

**TOTAL: 150**

**CREDIT:02**

### **OBJECTIVE:**

To give an introduction to structural details for the successful completion of a project .

### **OUT COME:**

Understanding the structural concepts and behavior of structural elements, using various systems and relating the knowledge acquired to architectural design.

### **PART – A**

1. Simple stresses and strain-concept of stress and strain ó Stress & strain diagrams for ductile and brittle materials Hookes Law, Young's modulus, Secant modulus, Ultimate stress yield stress, proof stress, Working stress and factor of safety ó Poisson's ratio ó Principle of superposition ó Rigidity modulus and Bulk modulus of elasticity, relationship between elastic constants ó Bars of varying cross-section-compound bars-temperature stresses.
2. Bending moment and shear force in beams: Bending moment and shear force Diagrams for statically determinate beams subjected to concentrated, uniformly distributed and uniformly varying loads.
3. Stress in Homogeneous beams: Simple bending theory, Moment of resistance section modulus of different cross sectional shapes variation of sheer stresses across sections
4. Deflection of Beams: Simply supported, Cantilever and Overhanging beams by the method of double integration-Macaulay's method.

### **PART – B**

5. Torsion of shafts ó Torsion equation for circular shafts ó Strength and stiffness of solid and hollow circular shafts ó transmission of power.
6. Compound stresses ó Principal stresses for the two dimensional stress systems-Mohr's circle of stress.
7. Elastic stability of columns ó Euler's formula, different end conditions ó Effective length of columns slenderness ratio ó Rankines formula

**NOTE:** In the examination one question is compulsory FOUR questions have to be set from each part and the student has to answer FIVE questions by selecting atleast TWO from each part.

óTHE SUBJECT HAS TO BE TAUGHT BY THE CIVIL ENGG. FACULTYó

**TEXT BOOK:** Strength of Materials & Theory of Structures ó Punmia, Jain & Jain.

**Term Work:** - Minimum of two tests to be conducted during the semester

**REFERENCE:**

1. Strength of Materials: Ferdinand L Singar and Andrew Pytel, Harper and Row Publishers, New York, Pergamon.1998
2. Strength of Materials ó S.K. Bansal ,2017
3. Strength of Materials ó B.S. Basavarajaiah& P. Mahadevappa Khanna Publishers, New Delhi.2010
4. Introduction to solid mechanics, I.K. shames, Prentice Hall Inc.1996
5. Elements of Strength of Materials 5<sup>th</sup>Edn. L.S. Timoshenko and D.H. Young. Affiliated East West Press Ltd.,2003
6. Strength of Materials ó Ramamrutham, Dhanpal Rai & Sons. 2011
7. Analysis of Structures ó Vol. 1, Vazirani and Ratwani, Khanna Publishers, 2003

## **18ARCH204- HISTORY OF ARCHITECTURE-II**

**CONTACT PERIODS PER WEEK: 3HOURS (3LECTURE)**

**EXAM DURATION: - 3 HOURS**

<b>CLASS MARKS</b>	<b>:</b>	<b>50</b>
<b>THEORY MARKS</b>	<b>:</b>	<b>100</b>
<b>TOTAL</b>	<b>:</b>	<b>150</b>
<b>CREDIT:02</b>		

### **OBJECTIVE:**

Presents an overview of the history of architecture; Greece, Roman Empire and Romanesque Architecture and to develop the appropriate skills of reading , discussion and writing as well as understanding of the Physical aesthetic experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

### **OUT COME:**

Architecture as evolving within specific cultural contexts including aspects of politics, society , religion, climate, geography and geology in Greece, Roman empire and Romanesque Architecture.

### **OUTLINE:**

- 1) Classical Greece Architecture-1: Study of architectural characteristics features from the Greek early periods and later periods  
Classical Greece Architecture-2: Critical appreciation of works and synoptic study of architectural characteristics features Doric, Ionic and Corinthian Orders and Optical Corrections.
- 2) Greek architectural Typologies: Study of principles of design of Greek buildings through study of three kinds of Architecture: a) Monumental ( Built to impress and Last) ex. Parthenon, Theatre at Epidauros, b) Domestic (Build to ingabit): House of Colline, House of Masks, etc., and c) Civic space: The Agora and Acropolis
- 3) Introduction to Roman Architecture: Critical appreciation of works and synoptic study of architectural characteristics features from the Roman periods, Study of tuscan and composite orders.
- 4) Roman architecture Typologies-I; Study of principles of design of Roman buildings through study of proportion, composition, visual effects etc., in Monumental ( Built to impress and last) Pantheon, Collseum, Thermae of cara calla

**REFERENCE S:**

- 1) 1. History of Architecture in India by Tadgell Christopher,1990
- 2) 2. Indian Architecture, Buddhist and Hindu period by Brown Percy,1942
- 3) 3. Architecture of India, Buddhist and Hindu by Grover, Satish, latest
- 4) 4. A History of Architecture by Bannister Fletcher.1996

## **18ARCH205-COMPUTER APPLICATION-I**

**CONTACT PERIODS PER WEEK: 3 Hours**

**EXAM DURATION: - NIL**

**CLASS MARKS: 100**

**THEORY EXAM MARKS: NIL**

**VIVA MARKS: NIL**

**TOTAL MARKS : 100**

**MINIMUM FOR PASS : 50**

**CREDIT:02**

### **OBJECTIVE:**

To initiate awareness of Computer applications in Visualizations of Geometry & Graphics

### **OUT COME:**

Exposure to various software and introducing computer applications to the student life.

### **OUTLINE:** Introduction to Computer and its basics hardware

Introduction to basic 3d software such as sketch up etc., which help in visualization of basic geometric primitives ( 3d objects) in orthographic projections and 3d views including isometric and perspectives.

Students shall be made to link their knowledge of orthographic projections learnt in the subject architectural graphics ( AR14-107) with exercises taught in this class.

**Term Work:** - Class marks shall be awarded only to submission of course work presented in hard copy (Prints on paper)

**18ARCH206-MEASURED DRAWING & DOCUMENTATION**

**CONTACT PERIODS PER WEEK: 3 HOURS (1 LECTURE+2STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS:50**

**EXAM MARKS: NIL**

**Total : 50**

**CREDIT:02**

**The measured drawing and documentation work have to be done once in the semester**

**OBJECTIVE:**

To develop the ability to make architectural drawing of simple Buildings-plans elevations, sections, views, through documentation of modest sized but significant historical moment.

**OUT COME:**

**Learning to overcome onsite problems while conducting survey and documenting.**

**OUTLINE:**

**Measured drawing of one significant historical** moment. To be done semester. The documentation shall include plans, elevation, sections, and views photo graphics video film. The entire class may be divided into groups and each group assigned different aspects of the work. Each group shall consist of not more than five students.

## **18ARCH207-ARCHITECTURAL GRAPHICS-II**

**(Perspective & socio graphy)**

**CONTACT PERIODS PER WEEK: 3 HOURS (1 LECTURE+2STUDIO)**

**EXAM DURATION: - NIL**

**CLASS MARKS:100**

**EXAM MARKS: NIL**

**Total : 100**

**CREDIT:02**

### **OBJECTIVE:**

To introduce the students to the fundamental techniques of architectural drawing.

### **OUT COME:**

Understanding of Graphic design elements, principles and applications, concept of form and space.

### **OUTLINE:**

Introduction to the basic principles of drawing, sign conventions, Practice in lettering, lettering used in architectural drawings, including different fonts, introduction to plane geometry and exercises in lines and angles, construction of triangles, quadrilaterals and regular polygons, construction of plane curves, ellipse, parabola, hyperbola and ovals, arches, typical arch forms and methods of drawing them. Scales, construction of plain and diagonal scales and their uses in practice. Orthographic projection (first angle projection). Principles of orthographic projection, projection of points, lines, planes, solids. Three dimensional representations, isometric and axonometric projection of solids.

- Section of solids, true shapes of sections.
- Development of surfaces
- Interpenetration of geometric solids, prism with prism cylinder with cylinder, cone with cylinder, cylinder with prism etc.

**Term Work:** - Plates on each of the above topics shall be presented for Viva examination.

### **REFERENCE BOOK:**

1. "Engineering drawing" by ND Bhat, 2014
2. "Geometrical Drawing for Arts Students" by IH Morris, 2017
3. "Engineering drawing Vol I and II" by KR Gopalakrishna, 2012
4. "Architectural Graphics" by Frank K. Ching, 1975

**Bangalore University**  
**University Visvesvaraya College of Engineering, Bengaluru**  
**Scheme of Teaching and Examination for I Semester B.Arch.**  
**Programmes: B.Arch. – Department of Architecture**

Sl. No.	Course Code	Title	Teaching Department	Hours/Week			Total hr/week	Examination Scheme			CIE Marks	SEE Marks	Total	Credits
				D.S	L	SS		Exam Duration	Theory Marks	Viva Marks				
1	18ARCH101	Architectural Design-I	Architecture	3	4	2	9	Viva	-	200	200	200	400	09
2	18ARCH102	Building Construction & Materials -I	Architecture	2	4	0	6	4	100	-	100	100	200	07
3	18AREN103	Structure for Architecture-I	Civil Eng	0	2	0	2	3	100	-	50	100	150	02
4	18ARCH104	History of Architecture-I	Architecture	0	2	0	2	3	100	-	50	100	150	02
5	18ARCH105	Work shop (Model Making)-V	Architecture	0	2	0	2	-	-	-	100	0	100	02
6	18ARHU106	Communication skills	Architecture	0	2	0	2	-	-	-	100	0	100	02
7	18ARCH107	Architectural Graphics-I	Architecture	0	2	0	2	-	-	-	50	0	50	02
8	18ARAR108	Visual Arts & Basic Design -I	Visual Art	0	2	0	2	-	-	-	100	0	100	02
9	18INDU109	Induction Course	Architecture	One Week Course										01
<b>Total</b>				04	23	0	27		300	200	750	500	1250	29
		ARC= Architectural Subjects ART= Art Subjects			ENG = Engineering Subjects			HUM = Humanities						
		No. of Subjects/Heads = 08			No. of Theory Examinations = 03									
		Minimum Marks for passing: Progressive Marks 50%, Theory Marks, Term work Marks and viva marks 40% in each												

**Bangalore University**  
**University Visvesvaraya College of Engineering, Bengaluru**  
**Scheme of Teaching and Examination for II Semester B.Arch.**

**Programmes: B.Arch. – Department of Architecture**

Sl. No.	Course Code	Title	Teaching Departme nt	Hours/Week			Total hr/week	Examination Scheme			CIE Marks	*SEE Marks	Total	Credits					
				D.S	L	SS		Exam Duration	Theory Marks	Viva Marks									
1	18ARCH201	Architectural Design-II	Architecture	3	4	2	9	Viva	-	200	200	200	400	09					
2	18ARCH202	Building Construction & Materials -II	Architecture	2	4	0	6	4	100	-	100	100	200	07					
3	18ENGG203	Structure for Architecture-II	Civil Eng	0	2	0	2	3	100	-	50	100	150	02					
4	18ARCH204	History of Architecture-II	Architecture	0	2	0	2	3	100	-	50	100	150	02					
5	18ARCH205	Computer Application -I	Architecture	0	2	0	2	-	-	-	100	0	100	02					
6	18ARCH206	Measured drawing & Documentation	Architecture	0	2	0	2	-	-	-	100	0	100	02					
7	18ARCH207	Architectural Graphics-II (Perspective & sociography)	Architecture	0	2	0	2	-	-	-	50	0	50	02					
8	18FART208	Visual Arts & Basic Design -II	Visual Art	0	2	0	2	-	-	-	100	0	100	02					
<b>Total</b>				04	23	0	27		300	200	750	500	1250	28					
		ARC= Architectural Subjects ART= Art Subjects			ENG = Engineering Subjects			HUM = Humanities											
		No. of Subjects/Heads = 08			No. of Theory Examinations = 03														
		Minimum Marks for passing: Progressive Marks 50%, Theory Marks, Term work Marks and viva marks 40% in each																	