RISE Krishna Sai Gandhi Group of Institutions

Assessment Manual

RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS

(Approved by AICTE-NEW DELHI, Affiliated to JNTUK KAKINADA)

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Introduction

1.1 INSTITUTE VISION AND MISSION

Institute Vision

To create a community of engineers who blend groundbreaking technologies with ethical responsibility, driving global innovations while championing sustainable solutions and community empowerment.

Institute Mission

IM1	Foster an inclusive academic setting that combines cutting-edge technology with ethical grounding.
IM2	Inspire sustainable innovation by embedding environmental and social responsibility into our curriculum.
IM3	Strengthen ties with industry and communities to ensure our engineers make a real-world impact.

1.2 DEPARTMENT VISION AND MISSION

Vision of Department:

To nurture electronics and communication engineers who integrate innovative tech with ethical standards, pioneering in global electronic advancements while emphasizing sustainability and societal betterment.

Mission of Department:

DM1	Infusing ethics and innovation in every electronics and communication curriculum.
DM2	Leading the charge in sustainable electronic breakthroughs for a better tomorrow.
DM3	Bridging global challenges with electronic solutions, grounded in community values.

1.3 DEFINITION of PEO, PSO

Program Educational Objectives (PEOs):

Program Educational Objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do.

1.4 STATEMENTS OF PEOs AND PSOs

Program Educational Objectives (PEOs):

PEO1	Prepare graduates to innovate and lead in the dynamic field of electronics and communication.
PEO2	Embed a strong ethos of sustainable and ethical electronic design practices.
PEO3	Equip graduates to foster interdisciplinary collaboration in tech - driven industries.

Program Specific Outcomes (PSOs)

PSO1	**Emergent Technologies Integration:** Empower students to seamlessly assimilate and implement emergent technologies, ensuring adaptability in a swiftly evolving electronics and communication landscape.
PSO2	**Sustainable Electronics Pioneering:** Guide students towards devising energy-efficient electronic solutions and communication systems, emphasizing environmental conservation and sustainable electronic advancements.

1.5 OUTCOME BASED EDUCATION

Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience, each student should have achieved the goal. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities, and assessments should all help students achieve the specified outcomes. The role of the faculty adapts into instructor, trainer, facilitator, and/or mentor based on the outcomes targeted.

Benefits of OBE:

Clarity

The focus on outcomes creates a clear expectation of what needs to be accomplished by the end of the course. Students will understand what is expected of them and teachers will know what they need to teach during the course. Clarity is important over years of schooling and when team teaching is involved.

Each team member, or year in school, will have a clear understanding of what needs to be accomplished in each class, or at each level, allowing students to progress Those designing and planning the curriculum are expected to work backwards once an outcome has been decided upon; they must determine what knowledge and skills will be required to reach the outcome.

Flexibility

With a clear sense of what needs to be accomplished, instructors will be able to structure their lessons around the student's needs. OBE does not specify a specific method of instruction, leaving instructors free to teach their students using any method. Instructors will also be able to recognize diversity among students by using various teaching and assessment techniques during their class. OBE is meant to be a student-centered learning model. Teachers are meant to guide and help the students understand the material in any way necessary, study guides, and group work are some of the methods instructors can use to facilitate students learning.

Comparison

OBE can be compared across different institutions. On an individual level, institutions can look at what outcomes a student has achieved to decide what level the student would be at within a new institution. On an institutional level, institutions can compare themselves, by checking to see what outcomes they have in common, and find places where they may need improvement, based on the achievement of outcomes at other institutions. The ability to compare easily across institutions allows students to move between institutions with relative ease.

The institutions can compare outcomes to determine what credits to award the student. The clearly articulated outcomes should allow institutions to assess the student's achievements rapidly, leading to increased movement of students. These outcomes also work for school to work transitions. A potential employer can look at records of the potential employee to determine what outcomes they have achieved.

They can then determine if the potential employee has the skills necessary for the job.

Involvement

Student involvement in the classroom is a key part of OBE. Students are expected to do their own learning, so that they gain a full understanding of the material. Increased student involvement allows students to feel responsible for their own learning, and they should learn more through this individual learning. Other aspects of involvement are parental and community, through developing curriculum, or making changes to it. OBE outcomes are meant to be decided upon within a school system, or at a local level. Parents and community members are asked to give input in order to uphold the standards of education within a community and to ensure that students will be prepared for life after school.

1.6 BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

The cognitive domain involves knowledge and the development of intellectual skills (Bloom, 1956). This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories of cognitive and processes, starting from the simplest to the most complex:

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

List of Taxonomy and the Verbs to be Used :

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Table: 1.6.1 List of taxonomy and the verbs to be used

Chapter - 2

COURSE OUTCOME STATEMENT

Course Outcomes (COs)

Statements indicating what a student can do after the successful completion of a course. Every Course leads to six Course Outcomes. Faculty considering the course content covered in each module defines the CO statements. The verbs used to define COs are based on Bloom's Taxonomy.

Sample Co Statements:

Course: Cellular and Mobile Communications **Course Code:** C421

Regulation: R16

Course Outcome	Course Outcome Statement	Bloom's Taxonomy level
After going through this Student should be able to		
C421.1	Analyze analog and digital cellular radio systems for mobile communication.	Analyzing
C421.2	Design a cellular system using frequency reuse concept and cell coverage for Signal traffic.	Applying
C421.3	Design the antenna system parameters by considering the effects in the reduction of C/I ratio.	Applying
C421.4	Apply frequency management and channel allocation schemes to improve the trunking efficiency.	Applying
C421.5	Analyze the Concepts of Handoff, cell splitting and operation of cellular system.	Analyzing
C421.6	Describe digital cellular networks.	Understanding

Table 2.1 Course Outcome Statements

Course: Electronic Circuit Analysis **Course Code: C221**
Regulation: R19

CO No.	Course Outcomes(COs)	BTL
C221.1	Design small signal high frequency amplifier circuits by using BJT and FET.	Applying
C221.2	Design of multi stage amplifiers using BJT & FET.	Applying
C221.3	Apply the concept of feedback to various types of amplifier circuits.	Applying
C221.4	Apply the principle of oscillations to different types of oscillator circuits.	Applying
C221.5	Analyze different power amplifiers and tuned amplifiers based on their performance.	Analyzing

Table 2.2 Course Outcome Statements

Guidelines for course code:

Every course code must start with year (2, 3, 4) and semester after that serial number of the course in the course structure in the university curriculum.

Ex: If anyone teaching for second year I sem then it will be start like 21--

CO writing guidelines:

Every Course outcome must start with verb based on the blooms taxonomy levels.

Number of course outcomes must be six.

1. Course outcome must have unique number (preferably Year/Semester/Course number)
2. It must be learning outcome consisting of verb and domain learning.
3. The course outcome must be measurable.
4. With the written course outcomes entire syllabus must be covered.
5. Statements should be easy to explain.

CO writing guidelines for laboratories:

Every Course outcome must start with verb based on the blooms taxonomy levels.

1. Number of course outcomes must be six.
2. Course outcome must have unique number (preferably Year/Semester/Course number)
3. It must be learning outcome consisting of verb and domain learning.
4. The course outcome for the experiments must be measurable.
5. With the written course outcomes all the experiments as per the syllabus must be covered.

6. Statements should be easy to explain.

CO writing guidelines for Project work

Every Course outcome must start with verb based on the blooms taxonomy levels.

1. Number of course outcomes must be six.
2. Course outcome for the project must have unique number (preferably Year/Semester/Course number)
3. It must be learning outcome consisting of verb and domain learning.
4. The course outcome for the project must be measurable.
5. With the written course outcomes the purpose of the project as per the syllabus must be covered.
6. Statements should be easy to explain.

Chapter – 3

Program Outcomes

Program Outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program

PO No	Description
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Chapter - 4

CO – PO AND CO – PSO MAPPING OF COURSES

For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below.

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

Sample CO-PO and CO-PSO

Mapping

Course: Cellular and Mobile Communications **Course Code: C421**

Regulation: R16

CO/PO	PO1	PO 2	PO3	PO4	PO 5	PO6	PO 7	PO 8	PO 9	PO10	PO1 1	PO12	PSO 1	PSO 2
C421.1	2	3	3	-	-	-	3	1	-	-	-	1	2	3
C421.2	2	2	3	-	-	-	3	2	-	-	-	1	2	2
C421.3	2	2	3	2	-	-	3	-	-	-	-	1	2	2
C421.4	2	3	1	-	-	2	3	1	-	2	-	1	2	3
C421.5	3	3	3	-	-	-	3	3	-	-	-	3	3	3
C421.6	2	3	3	-	-	-	3	-	-	-	1	1	2	3
C421	**2.17**	**2.67**	**2.67**	**2.00**	-	**2.00**	**3.00**	**1.75**	-	**2.00**	**1.00**	**1.33**	**2.17**	**2.67**

Table 4.1 CO_PO/PSO Mapping table

Course: Electronic Circuit Analysis **Course Code: C221**
Regulation: R19

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C221.1	2	3	3	-	-	-	-	-	-	-	-	-	3	2
C221.2	3	3	2	-	-	-	-	-	-	-	-	-	3	2
C221.3	3	3	3	-	-	-	-	-	-	-	-	-	2	3
C221.4	3	3	3	-	-	-	-	-	-	-	-	-	3	2
C221.5	2	3	3	-	-	-	-	-	-	-	-	-	3	3
C221	**2.6**	**3**	**2.8**	-	-	-	-	-	-	-	-	-	**2.8**	**2.4**

Table 4.2 CO_PO/PSO Mapping table

CO-PO mapping:

1. Each course outcome must be mapped to program outcome at level 3 or high.

2. Each course outcome must be mapped to minimum 5 POs

3. Each CO-PO Mapping justification sentence written by using syllabus topics

4. CO-PO mapping table must be in course file.

Gaps identification process

1. The Course Coordinator study the curriculum given by the University for the Program.
2. By analyzing the contents of the course, the course coordinator prepares the outcomes of the course.
3. Course outcomes are mapped with Program Outcomes (POs) and Program Specific Outcomes (PSOs)
4. Department assessment Committee collects the data from Course coordinators and the department committee approves the proposed mapping.
5. The Mapping of the Courses verses PO/PSO is consolidated.
6. By collecting information in form of Alumni Survey reports, Exit Student report, Industrial Experts survey report, Department Committee analyzes the information along with the consolidated PO/PSO mapping and identifies the gaps in the curriculum.
7. The identified gaps are communicated to the Department advisory committee which is communicated to college academic committee after review.
8. After review, Department Committee finalizes the curriculum gap.

CO-PO mapping of Gaps within the syllabus:

S. No	Name of The Course	Curriculum Gap	Class	Faculty	Mapped COs	Mapped POs, PSOs
1	Electronic Devices And Circuits	Voltage Regulators Series And Parallel	II-I	Dr. Jeya kumar. K	C211.3	PO2,PO3,PSO2
2	Switching Theory And Logic Design	1.Hazards & Hazards Free Realization 2.Sequence Detector	II-I	Mr.I.Vidya Sagar	C212.6	PO1,PO2,PO3,PO4 ,P O12,PSO1,PSO2
3	Signals And Systems	Transient Response And Steady State Response of First Order System	II-I	Mr.D.V. Manikanta	C215.2	PO1,PO2,PO3,PO4 ,P O12,PSO1,PSO2
4	Random Variables And Stochastic Process	Gaussian Random Variable	II-I	Mr.R.V.Kiran Kumar	C216.3	PO1,PO2,PO12,PS O 1
5	Managerial Economics & Financial Analysis	Economic Theory And Practical Application.	II-I	M.Sireesha	C215.3	PO1,PO2PO-7, PSO1
6	Electronic Circuit Analysis	Crystal Oscillator	II-I	Dr. Sivalingam.S	C221.4	PO1,PO2,PO3,PSO 1, PSO2
7	Linear Control systems	Wave Propagation In Good Conductor	II-II	Mr.I.Vidya Sagar	C222.2	PO1,PO2,PO3,PSO1

8	Analog Communication s	Am Modulation With Complex V wave	II-II	Mr.Ch.Anil Babu	C224.1	PO1,PSO1
10	Linear Ic Applications	ADC 0808/0809 Family Converter	III-I	Mr. K. Anji reddy	C312.6	PO2,PO3,PO4,PSO2
11	Digital Ic Applications	Verilog Coding For Digital Designs	III-I	Mr.Ch.Meeravali	C313.5, C 313.6	PO1,PO2,PSO2
13	Antennas And Wave Propagation	Sky Wave Propagation	III-I	Mr.S.V. Ravi Kumar	C315.4	PO1,PO2,PO3,PSO2
14	Microprocessors And Microcontrollers	Memory Interfacing Example	III-II	Mrs.N.Uma Kumari	C321.3	PO2,PO3,PO4,PSO2
15	Digital Signal Processing	Design of Optimum Equi Ripple Approximation LPF	III-II	Mr.G.Venkata Karthik	C322.4	PO1,PO2,PO3,PSO1
16	Microwave Engineering	High Gain Linear Beam Tube	III-II	Mr. M.S. Lakshmi Narayana	C325.3	PO1.PO2,PO3,PO4,PO6,PO12,PSO1, PSO2
17	VLSI Design	Layout Diagram of EXOR Gate	III-II	Mr.K.Nagahanuma Chary	C411.2	PO1,PO2,PO11,PSO 1
18	Computer Networks	TCP & UDP	III-II	Mr.M.Sandeep Kumar	C412.3	PO1,PO2,PO3,PSO2
19	Bio Medical Engineering	1.Bio Sensors 2.Eog 3.Egg	III-II	Mr.Sk.Bajidvali	C325.1, C325.5, C325.6	PO1,PO2,PO3,PO12, PSO1

20	Digital Image Processing	Fundamental Operations of Digital Image Using Mat Lab	IV-I	Dr. Sangati Pavan Kumar	C413.5	PO1,PO2,PO3, PO4, PO5, PO6, PO12,PSO1,PSO2
21	Radar Systems	Modified Radar Equations	IV-I	Mr.Sk.Karimulla	C415.1	PO1,PO3,PO12,PSO 2
23	Optical Communication	Explanation of SDH And DWDM	IV-I	Mrs.N.Uma Kumari	C416.6	PO1.PO2,PO3,PSO1, PSO2
24	Cellular Mobile Communication	Power Difference Hand off	IV-II	Dr.Sivaraman. G	C421.5	PO1,PO2,PO3,PO7,P SO1,PSO2
25	Satellite Communication	OFDMA	IV-II	Mr.K.Sateesh Kumar	C423.4	PO1,PO2,PO3,PSO1
26	Wireless Sensors And Networks	Driving Routing Protocol	IV-II	Mr.S.V. Ravi Kumar	C423.3	PO1,PO2,PSO1

Table 4.3 CO_PO Mapping for gaps within the syllabus

CO-PO Mapping of Gaps beyond the syllabus:

S. No	Topic	Propose Action	Po mapped
1	Recent trends in IOT	Three day Workshop on "INTERNET OF THINGS"	PO-1,3,5,,9,12 PSO-1,2
2	Advanced Research Concepts	Guest lecture on Electronics Trends Present & Future :Defense applications	PO-1,3,5,6,,9,12 PSO-1,2
3	Advances in telecommunicati on	Guest lecture on telecommunication	PO-1,3,6,7,9,12 PSO-1,2
4	Design and manufacturing of Printed circuit board	A 3-Day National Level Workshop on PCB Design for Electronic Designs	PO-1,3,5,6,7,9,12 PSO-1,2
5	Latest Trends in VLSI Design	Guest lecture on VLSI Design	PO-1,3,5,6,,9,12 PSO-1,2
6	Basics in Electronics	Guest lecture on Electronic Devices	PO-1,3,5,6,7,9,12 PSO-1,2

Table 4.4 CO_PO Mapping for gaps and topic beyond syllabus

Additional Experiments:

List the Additional experiments identified in previous year i.e., 19-20

S.No	Name of the Lab	Additional Experiments
1	EDC	• Operation of LED • Bridge Rectifier with and without filter
2	ECA	• Clapp Oscillator • Differential Amplifier
3	PDC	• Transistor Sweep Generator. • Pulse synchronization of sweep circuit.
4	AC	• SSB modulation & de modulation. • Characteristics of mixer.
5	DC	• ASK • QPSK
6	MPMC	• Finding GCD of a Number • Logic Operations-Converting Packed BCD to Unpacked BCD, Converting BCD to
7	LICA	• Inverting and Non-inverting Amplifiers • All Pass Filter
8	DICA	• Half Adder • Half Subtractor
9	VLSI	• Design and Implementation of Multiplexer • Design and Implementation of Encoder
10	MWE	• VSWR Measurement. • Waveguide parameters measurement.

Table 4.5 List of additional experiments.

Chapter – 5

ASSESSMENT PROCESS

COURSE ASSESSMENT (PLAN & EXECUTION)

Regulation: R-16 **A.Y: 2021-22**

The assessment of course outcomes (COs) are categorized into two methods.

1. Direct Assessment method
2. Indirect Assessment method

Direct Assessment method:

The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory subject and 75 marks for practical subject. The project work shall be evaluated for 200 marks and seminar for 50 marks.

The direct assessment methods along with their assessment criteria are given in below Table.1

Table.1 Direct assessment methods and description

S. No	Course	Assessment method	Frequency	Assessment criteria
1	**Theory Course (Internal assessment)**	Descriptive examinations	Twice in a semester	It is a metric to continuously assess the attainment of course outcomes, student's learning domains and thus improve the teaching –learning process. For theory subjects, during the semester there shall be 2 tests. The Weightage of Internal marks for 30 consists of Descriptive – 15, Assignment - 05, Objective -10 (Conducted at College level with 20 Multiple choice questions with a weightage of ½ Mark each). The objective examination is for 20 minutes duration. The subjective examination is for 90 minutes duration conducted for 15 marks. Each subjective type test question paper shall contain 3 questions and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 15 marks are to be added to the assignment marks of 5 for finalizing internal marks for 30. The addition of 80% of maximum internal marks from two tests and 20% from minimum internal marks will be taken for final internal marks. As the syllabus is framed for 6 units, the 1st mid examination (both Objective and
		Objective examinations	Twice in a semester	
		Assignments	Twice in a semester	

				Subjective) is conducted in 1-3 units and second test in 4-6 units of each subject in a semester.
	Theory Course (External assessment)	End semester examination	Once in a semester	The end semester examination is conducted covering the topics of all Units for 70 marks. Part – A contains a mandatory question for 22 marks (Which covers entire syllabus). Part – B has 6 questions (One from each Unit). The student has to answer 3 out of 6 questions in Part – B and carries a weightage of 16 marks each.
2	**Laboratory courses (Practical course)**	Continuous evaluation and record	Continuous	For practical subjects there shall be continuous evaluation during the semester for 25 internal marks and 50 end examination marks. The internal 25 marks shall be awarded as follows: continuous evaluation – 10 marks, Record-5 marks and the remaining 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner. The external 50 marks shall be awarded as follows: write-up – 20 marks, execution – 20 marks and viva-voce of 10 marks.
		Internal examination	Once in a semester	
		External examination	Once in a semester	

Course outcome assessment procedure for theory course:

The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 30% of Internal Assessment + 70% of External Assessment

Internal Assessment =15% of DESCRIPTIVE + 10% of OBJECTIVE + 5% of ASSIGNMENT

Course outcome assessment procedure for laboratory course:

The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 33.33% of Internal Assessment + 66.67% of External Assessment

Internal Assessment =13.33% of Continuous Evaluation + 6.67% of Record + 13.33% of Lab Internal Exam

Indirect Assessment method:

This method is based on student's knowledge and skills acquired from different types of courses.

The indirect assessment methods along with their assessment criteria are given in Table.2

Table.2 Indirect assessment methods and description

S. No	Type of component	Frequency	Assessment criteria
1	Course End Survey	Once at the end of semester	Collect information from the students to assess the course outcomes at the end of the semester.

CO Assessment = 80% of CO Direct Assessment + 20% CO Indirect Assessment

Internal Attainment:

Set Target: 60%

Attainment Level	Attainment Description
3	More than 60% number of students scoring more than the set target marks in internal assessment tools.
2	40-60 % number of students scoring more than the set target marks in internal assessment tools.
1	Less than 40% number of students scoring more than the set target marks in internal assessment tools.

External Attainment:

Set Target: SGPA-5

Attainment Level	Attainment Description
3	More than 60% number of students scoring more than the **set target** in External assessment tools.
2	40-60 % number of students scoring more than the **set target** in External assessment tools.
1	Less than 40% number of students scoring more than the **set target** in External assessment tools.

Assessment Tools Used for Theory Course:

- **Internal examination**
  - Descriptive Examinations
  - Objective Examinations
  - Assignments
- End Examination

Assessment Tools Used for Laboratory Course:

- Day to Day work (Continuous Evaluation)
- Record
- Internal Exam
  - Initial Procedure
  - Conduct of Experiment
  - Result/Graph
  - Viva-Voce
- End Examination
  - Write-up
  - Execution/Conduction
  - Result/Graph
  - Viva-Voce

Indirect method:

Indirect attainment process includes student's feedback on course outcome and assessment by using student feedback form.

Theory Courses Assessment (Direct method):

1. Descriptive Examination

Four subjective questions from each unit and total 12 questions will be sent to the examination branch and question paper will be given, among these 12 questions three questions will be selected by the exam branch in charge and 2 such examinations will be conducted for each course. Students should attempt three questions carrying 5Marks each.

Name of the Faculty: Dr.G.Sivaraman **Course Name: CMC**

Year& Sem :IV-II **Examination : I MID**

Course Code: C421 **Academic Year: 2021-22**

Q. NO.	QUESTION	CO NO.	BTL	MARKS
1	(a) Explain various techniques used to increase the capacity of a cellular system	C421.1	[Understanding]	3
	(b) Explain the various components of a Cellular system	C421.1	[Understanding]	2
2	(a) Compare the co-channel interference performance of a directional antenna system for k=7 and k=4	C421.2	[Understanding]	3
	(b) Explain signal reflections in flat and hilly terrain with neat diagram	C421.2	[Remembering]	2
3	(a) Explain different types of antennas used for improving coverage and explain them	C421.3	[Understanding]	3
	(b) Explain the concept of space diversity antennas with a neat diagram	C421.3	[Remembering]	2

Table 5.2 : Sample Descriptive Question paper of Internal-1

SCHEME OF EVALUATION FOR IV B.TECH II SEM MID-I

Q.No	Distribution of topic	Sub Marks	Total Marks
1.a	capacity of a cellular system	3	5
1.b	components of a Cellular system	2	
2.a	co-channel interference performance of a directional antenna system for k=7	1.5	5
	co-channel interference performance of a directional antenna system for k=4	1.5	
2.b	signal reflections in flat and hilly terrain with neat diagram	2	
3	types of antennas used for improving coverage with explanation	3	5
	concept of space diversity antennas with a neat diagram	2	

Marks scored by the students were entered into internally developed Excel sheet to calculate CO attainment.

Sl. No	Roll No	DESCRIPTIVE 1			
		Q1	Q2	Q3	Total
		5	5	5	
1	178B1A0401	5	5	5	**15**
2	178B1A0402	4	5	5	**14**
3	178B1A0403	5	4	5	**14**
4	178B1A0404	5	5	5	**15**
5	178B1A0405	5	5	5	**15**
6	178B1A0406	5	5	5	**15**
7	178B1A0407	5	5	5	**15**
8	178B1A0408	4	4	5	**13**
9	178B1A0409	5	5	5	**15**
10	178B1A0410	5	4	5	**14**
11	178B1A0412	4	5	5	**14**
12	178B1A0413	4	4	4	**12**
13	178B1A0414	5	5	5	**15**
14	178B1A0415	5	4	5	**14**
15	178B1A0416	5	5	5	**15**

16	178B1A0417	5	5	5	**15**
17	178B1A0418	5	1	4	**10**
18	178B1A0419	5	5	5	**15**
19	178B1A0420	3	3	3	**9**
20	178B1A0421	5	4	5	**14**
21	178B1A0422	5	5	5	**15**
22	178B1A0423	4	4	5	**13**
23	178B1A0424	5	5	5	**15**
24	178B1A0425	5	2	4	**11**
25	178B1A0426	3	0	1	**4**
26	178B1A0427	5	5	0	**10**
27	178B1A0428	4	4	5	**13**
28	178B1A0429	5	5	5	**15**
29	178B1A0430	5	4	5	**14**
30	178B1A0431	5	5	5	**15**
31	178B1A0432	5	4	4	**13**
32	178B1A0433	5	5	5	**15**
33	178B1A0434	4	5	1	**10**
34	178B1A0435	5	1	3	**9**
35	178B1A0436	5	5	5	**15**
36	178B1A0437	5	4	5	**14**
37	178B1A0438	4	4	4	**12**
38	178B1A0439	5	5	5	**15**
39	178B1A0440	2	3	2	**7**
40	178B1A0441	2	3	2	**7**
41	178B1A0442	2	0	0	**2**
42	178B1A0443	0	0	0	**0**
43	178B1A0444	3	1	2	**6**
44	178B1A0445	1	0	1	**2**
45	178B1A0446	0	0	0	**0**
46	178B1A0447	4	4	4	**12**
47	178B1A0448	2	0	0	**2**
48	178B1A0449	3	3	3	**9**
49	178B1A0450	5	4	4	**13**
50	178B1A0451	4	4	5	**13**
51	178B1A0452	4	5	4	**13**
52	178B1A0453	4	4	4	**12**
53	178B1A0454	5	4	5	**14**
54	178B1A0455	5	4	5	**14**
55	178B1A0456	4	4	4	**12**
56	178B1A0457	5	4	4	**13**
57	178B1A0458	4	4	4	**12**
58	178B1A0459	4	5	5	**14**

59	178B1A0461	4	5	3	**12**
60	178B1A0462	5	5	4	**14**
61	178B1A0463	3	3	4	**10**
62	178B1A0464	2	4	3	**9**
63	178B1A0465	4	3	4	**11**
64	178B1A0466	4	3	4	**11**
65	178B1A0467	4	0	0	**4**
66	178B1A0468	3	3	1	**7**
67	178B1A0470	5	5	4	**14**
68	178B1A0471	5	5	4	**14**
69	178B1A0472	4	4	4	**12**
70	178B1A0473	4	4	4	**12**
71	178B1A0474	4	4	4	**12**
72	178B1A0475	3	2	2	**7**
73	178B1A0476	1	0	0	**1**
74	178B1A0477	5	4	4	**13**
75	178B1A0478	5	5	5	**15**
76	178B1A0479	5	2	0	**7**
77	178B1A0480	2	1	0	**3**
78	178B1A0482	1	0	1	**2**
79	178B1A0483	4	4	3	**11**
80	178B1A0484	2	0	0	**2**
81	178B1A0485	4	5	4	**13**
82	178B1A0486	1	0	0	**1**
83	178B1A0487	5	5	5	**15**
84	178B1A0488	1	1	0	**2**
85	178B1A0489	2	1	1	**4**
86	178B1A0491	1	1	0	**2**
87	178B1A0492	0	0	0	**0**
88	178B1A0493	1	1	0	**2**
89	178B1A0494	2	2	3	**7**
90	178B1A0495	5	4	2	**11**
91	178B1A0496	1	4	0	**5**
92	178B1A0497	2	5	2	**9**
93	178B1A0498	0	0	0	**0**
94	178B1A0499	1	0	1	**2**
95	178B1A04A0	1	1	0	**2**
96	178B1A04A1	2	4	3	**9**
97	178B1A04A3	4	4	4	**12**
98	178B1A04A4	2	4	4	**10**
99	178B1A04A5	1	1	2	**4**
100	178B1A04A6	2	2	2	**6**
101	178B1A04A7	2	5	3	**10**

102	178B1A04B0	1	1	1	**3**
103	178B1A04B2	1	1	1	**3**
104	178B1A04B4	4	5	4	**13**
105	178B1A04B5	2	3	4	**9**
106	178B1A04B6	3	4	3	**10**
107	178B1A04B7	4	5	4	**13**
108	178B1A04B8	1	2	2	**5**
109	178B1A04B9	2	4	3	**9**

From the above Excel sheet calculate the following.

1. The no. of students attempted the question,
2. Class threshold mark,
3. No. of students scored more than threshold marks for each question,
4. Percentage of students scored more than the threshold marks.

Course Outcome Attainment (Internal Examination-1)

S.NO	Parameter	Q1	Q2	Q3
1	Maximum Marks	5	5	5
2	Threshold marks	3	3	3
3	No. of students scored above Threshold mark	**75**	77	73
4	No. of students Attempted the question	109	109	109
5	Percentage of students scored above threshold mark	68.81	70.64	66.97
6	Attainment level	3	3	3

Table 5.4: Descriptive marks scored above threshold marks

CO Attainment based on Exams:

Attainment is calculated for each CO based on the questions given in the Internal Exam and the percentage of students scored above threshold marks.

CO NO	Mid-1 attainment level	Quiz-1 attainment level	Assignment-1 attainment level	Mid-2 attainment level	Quiz-2 attainment level	Assignment-2 attainment level	University exam attainment level	Overall
C421.1	3	3	3				3	3.00
C421.2	3	3	3				3	3.00
C421.3	3	3	3				3	3.00
C421.4				3	3	3	3	3.00
C421.5				3	3	3	3	3.00
C421.6				3	3	3	3	3.00
Direct Course attainment								**2.95**

Table 5.5: CO attainment for internal exams

CO NO	MID-1	Quiz-1	Assignment-1	MID-2	Quiz-2	Assignment-2
C413.1	68.81	96.33	100			
C413.2	70.64	96.33	100			
C413.3	66.97	96.33	100			
C413.4				90.83	99.08	100.0
C413.5				91.74	99.08	100.0
C413.6				81.65	99.08	100.0

Table 5.6.CO Attainment Percentage

In case multiple questions were asked for any CO, average was taken to calculate the percentage students attained that CO and overall course attainment for the internal examination is calculated.

Rubrics for Attainment:

1.If the average (i.e subj, obj, assignment) % of each Course outcome is in between 0-40% then it is considered as low attainment i.e 1(one)

2. If the average (i.e subj,obj,assignment) % of each Course outcome is in between 40%-60% then, it is considered as medium attainment i.e 2(Two)

3. If the average (i.e subj, obj, assignment) % of each Course outcome is >60% ,then it is considered as high attainment i.e 3(Three).

Attainment Level	
1	0<40%
2	40-60%
3	>60%

Table 5.7: Rubrics for Internal Attainment

1. Subjective Examination

One subjective question from each unit is given. Students need to write all questions, carrying 10 Marks. After finishing the mid exam, faculty concerned will evaluate the answers given by students and marks are awarded. Marks scored by the students are entered into internally developed Excel sheet to calculate CO attainment.

From the above Excel sheet calculate the no. of students attempted the question, threshold mark, no. of students scored more than threshold marks for each question, and Percentage of students scored more than the threshold marks.

2. Objective Examination

20 objective questions for each internal examination will be given by the university and 2 such examinations will be conducted for each course. Students need to attempt all questions, carrying 1.0 Marks each. Marks scored by the students will be entered into internally developed Excel sheet to calculate CO attainment.

From the Excel sheet we can calculate the no. of students attempted the online examination, threshold mark, no. of students scored more than threshold marks , percentage of students scored more than the threshold.CO mapping was done considering all 20 questions given in the examination (considering the CO's mapped in the subjective examination).

3. Assignment:

Four subjective questions for each unit are given. Students need to write all questions, carrying 5Marks.After submitting the assignment questions to the faculty concerned, marks are awarded to students. Marks scored by the students are entered into internally developed Excel sheet to calculate CO attainment.

From the above Excel sheet calculate the no. of students attempted the question, threshold mark, no. of students scored more than threshold marks for each question, and Percentage of students scored more than the threshold marks.

4. University Examination:

University Examinations will be conducted by JNTU-Kakinada at the end of each semester. After getting results from the university, the marks obtained by the students will be entered in internally developed assessment excel sheets to calculate the university attainment of respective subjects.

Sl. No	Roll No	UNIV GRADE	UNIV GRADE POINT
1	178B1A0401	B	**7**
2	178B1A0402	A	**8**
3	178B1A0403	B	**7**
4	178B1A0404	B	**7**
5	178B1A0405	B	**7**
6	178B1A0406	B	**7**
7	178B1A0407	B	**7**
8	178B1A0408	B	**7**
9	178B1A0409	B	**7**
10	178B1A0410	C	**6**
11	178B1A0412	B	**7**
12	178B1A0413	A	**8**
13	178B1A0414	B	**7**
14	178B1A0415	C	**6**
15	178B1A0416	B	**7**
16	178B1A0417	A	**8**
17	178B1A0418	C	**6**
18	178B1A0419	B	**7**
19	178B1A0420	D	**5**
20	178B1A0421	C	**6**
21	178B1A0422	B	**7**
22	178B1A0423	B	**7**
23	178B1A0424	A	**8**
24	178B1A0425	C	**6**
25	178B1A0426	C	**6**
26	178B1A0427	B	**7**
27	178B1A0428	B	**7**
28	178B1A0429	A	**8**
29	178B1A0430	B	**7**
30	178B1A0431	A	**8**
31	178B1A0432	C	**6**
32	178B1A0433	F	**0**

33	178B1A0434	A	**8**
34	178B1A0435	C	**6**
35	178B1A0436	A	**8**
36	178B1A0437	A	**8**
37	178B1A0438	B	**7**
38	178B1A0439	A	**8**
39	178B1A0440	C	**6**
40	178B1A0441	C	**6**
41	178B1A0442	C	**6**
42	178B1A0443	D	**5**
43	178B1A0444	C	**6**
44	178B1A0445	C	**6**
45	178B1A0446	B	**7**
46	178B1A0447	B	**7**
47	178B1A0448	C	**6**
48	178B1A0449	C	**6**
49	178B1A0450	B	**7**
50	178B1A0451	B	**7**
51	178B1A0452	A	**8**
52	178B1A0453	A	**8**
53	178B1A0454	B	**7**
54	178B1A0455	B	**7**
55	178B1A0456	A	**8**
56	178B1A0457	B	**7**
57	178B1A0458	B	**7**
58	178B1A0459	A	**8**
59	178B1A0461	F	**0**
60	178B1A0462	A	**8**
61	178B1A0463	A	**8**
62	178B1A0464	A	**8**
63	178B1A0465	A	**8**
64	178B1A0466	B	**7**
65	178B1A0467	C	**6**
66	178B1A0468	C	**6**
67	178B1A0470	B	**7**
68	178B1A0471	B	**7**
69	178B1A0472	B	**7**
70	178B1A0473	C	**6**
71	178B1A0474	A	**8**
72	178B1A0475	C	**6**
73	178B1A0476	B	**7**
74	178B1A0477	B	**7**
75	178B1A0478	A	**8**

76	178B1A0479	B	**7**
77	178B1A0480	A	**8**
78	178B1A0482	B	**7**
79	178B1A0483	B	**7**
80	178B1A0484	B	**7**
81	178B1A0485	B	**7**
82	178B1A0486	C	**6**
83	178B1A0487	A	**8**
84	178B1A0488	B	**7**
85	178B1A0489	C	**6**
86	178B1A0491	B	**7**
87	178B1A0492	C	**6**
88	178B1A0493	B	**7**
89	178B1A0494	B	**7**
90	178B1A0495	A	**8**
91	178B1A0496	B	**7**
92	178B1A0497	C	**6**
93	178B1A0498	D	**5**
94	178B1A0499	C	**6**
95	178B1A04A0	B	**7**
96	178B1A04A1	C	**6**
97	178B1A04A3	B	**7**
98	178B1A04A4	C	**6**
99	178B1A04A5	D	**5**
100	178B1A04A6	C	**6**
101	178B1A04A7	B	**7**
102	178B1A04B0	F	**0**
103	178B1A04B2	D	**5**
104	178B1A04B4	B	**7**
105	178B1A04B5	B	**7**
106	178B1A04B6	F	**0**
107	178B1A04B7	B	**7**
108	178B1A04B8	D	**5**
109	178B1A04B9	C	**6**

Table 5.8: University Grade & Grade Point obtained for External attainment

Attainment Level	Percentage students
1	0-40%
2	40-60%
3	>60%

Table 5.9: Rubrics for External attainment

External attainment level can be calculated based on % of students who scored more than the threshold marks as given below.

Total no. of students performed above target / Total no. of students attended

S.NO	Parameter	University
1	Maximum Grade	10
2	Class Threshold marks	24
3	No. of students scored above threshold	105
4	No. of students Appeared	109
5	Percentage of students scored above threshold	96
6	Class threshold level of attainment	3

Table5.10: External marks scored above threshold marks

Course Attainment Calculations:

Attainment was calculated and each CO was given same attainment considering all questions. Overall Course Attainment Level = 60% (Average Internal Attainment) + 40% (Average University Attainment).

Internal & University Attainment:	3.00	3.00
Weightage	60%	40%
CO Attainment for the course (Internal, University)	3.00	3.00
CO Attainment for the course (Direct Method)	2.90	

Table5.11: Sample Overall Course Attainment Level

1. Average Internal Attainment is obtained from average of all CO's attainment for Internal Exam
2. Average University Attainment is obtained from average of all CO's attainment for university exam.

CO NO	Mid-1 attainment level	Quiz-1 attainment level	Assignment- 1 attainment level	Mid-2 attainment level	Quiz-2 attainment level	Assignment- 2 attainment level	University exam attainment level	Overall
C421.1	3	3	3				3	3.00
C421.2	3	3	3				3	3.00
C421.3	3	3	3				3	3.00
C421.4				3	3	3	3	3.00
C421.5				3	3	3	3	3.00
C421.6				3	3	3	3	3.00
				Direct attainment(C421)				**3.00**

CO No.	Course Outcomes(COs)	BTL
C421.1	Analyze analog and digital cellular radio systems for mobile communication.	Analyzing
C421.2	Design a cellular system using frequency reuse concept and cell coverage for Signal traffic.	Applying
C421.3	Design the antenna system parameters by considering the effects in the reduction of C/I ratio.	Applying
C421.4	Apply frequency management and channel allocation schemes to improve the trunking efficiency.	Applying
C421.5	Analyze the Concepts of Handoff, cell splitting and operation of cellular system.	Analyzing
C421.6	Describe digital cellular networks.	Understanding
Overall Course Attainment Level = 2.89		

Table 5.12: Sample Average Internal & External Attainment

1. CO attainment Level is obtained from Mid Exams which is of three Levels, based on percentage obtained by taking

(Subj *20% + Obj*10 % + Uni*70 %)

Table 5.13: Sample CO attainment Level

2. Subjective % , Objective % , Assignment % is calculated based on the number of students who attempted the question and scored more than target % for the corresponding course

Sl. No	Roll No	DESCRIPTIVE 1				Quiz 1	Assign 1
		Q1	Q2	Q3	Total	10	5
		5	5	5			
1	178B1A0401	5	5	5	**15**	6	**5**
2	178B1A0402	4	5	5	**14**	9	**5**
3	178B1A0403	5	4	5	**14**	6	**5**
4	178B1A0404	5	5	5	**15**	8	**5**
5	178B1A0405	5	5	5	**15**	7	**5**
6	178B1A0406	5	5	5	**15**	7	**5**
7	178B1A0407	5	5	5	**15**	9	**5**
8	178B1A0408	4	4	5	**13**	9	**5**
9	178B1A0409	5	5	5	**15**	9	**5**
10	178B1A0410	5	4	5	**14**	9	**5**
11	178B1A0412	4	5	5	**14**	9	**5**
12	178B1A0413	4	4	4	**12**	9	**5**
13	178B1A0414	5	5	5	**15**	9	**5**
14	178B1A0415	5	4	5	**14**	9	**5**
15	178B1A0416	5	5	5	**15**	8	**5**
16	178B1A0417	5	5	5	**15**	8	**5**
17	178B1A0418	5	1	4	**10**	6	**5**
18	178B1A0419	5	5	5	**15**	9	**5**
19	178B1A0420	3	3	3	**9**	8	**5**
20	178B1A0421	5	4	5	**14**	9	**5**
21	178B1A0422	5	5	5	**15**	9	**5**
22	178B1A0423	4	4	5	**13**	9	**5**
23	178B1A0424	5	5	5	**15**	9	**5**
24	178B1A0425	5	2	4	**11**	5	**5**
25	178B1A0426	3	0	1	**4**	3	**5**
26	178B1A0427	5	5	0	**10**	7	**5**
27	178B1A0428	4	4	5	**13**	3	**5**
28	178B1A0429	5	5	5	**15**	10	**5**
29	178B1A0430	5	4	5	**14**	6	**5**
30	178B1A0431	5	5	5	**15**	6	**5**
31	178B1A0432	5	4	4	**13**	5	**5**
32	178B1A0433	5	5	5	**15**	5	**5**
33	178B1A0434	4	5	1	**10**	4	**5**
34	178B1A0435	5	1	3	**9**	4	**5**

35	178B1A0436	5	5	5	**15**	3	**5**
36	178B1A0437	5	4	5	**14**	3	**5**
37	178B1A0438	4	4	4	**12**	4	**5**
38	178B1A0439	5	5	5	**15**	4	**4**
39	178B1A0440	2	3	2	**7**	3	**4**
40	178B1A0441	2	3	2	**7**	4	**4**
41	178B1A0442	2	0	0	**2**	3	**4**
42	178B1A0443	0	0	0	**0**	4	**4**
43	178B1A0444	3	1	2	**6**	4	**4**
44	178B1A0445	1	0	1	**2**	2	**4**
45	178B1A0446	0	0	0	**0**	8	**4**
46	178B1A0447	4	4	4	**12**	4	**5**
47	178B1A0448	2	0	0	**2**	4	**4**
48	178B1A0449	3	3	3	**9**	5	**4**
49	178B1A0450	5	4	4	**13**	6	**5**
50	178B1A0451	4	4	5	**13**	7	**5**
51	178B1A0452	4	5	4	**13**	7	**5**
52	178B1A0453	4	4	4	**12**	6	**5**
53	178B1A0454	5	4	5	**14**	6	**5**
54	178B1A0455	5	4	5	**14**	6	**5**
55	178B1A0456	4	4	4	**12**	7	**5**
56	178B1A0457	5	4	4	**13**	6	**5**
57	178B1A0458	4	4	4	**12**	6	**5**
58	178B1A0459	4	5	5	**14**	5	**5**
59	178B1A0461	4	5	3	**12**	9	**5**
60	178B1A0462	5	5	4	**14**	5	**5**
61	178B1A0463	3	3	4	**10**	5	**5**
62	178B1A0464	2	4	3	**9**	5	**5**
63	178B1A0465	4	3	4	**11**	8	**5**
64	178B1A0466	4	3	4	**11**	4	**5**
65	178B1A0467	4	0	0	**4**	5	**5**
66	178B1A0468	3	3	1	**7**	4	**4**
67	178B1A0470	5	5	4	**14**	6	**5**
68	178B1A0471	5	5	4	**14**	1	**5**
69	178B1A0472	4	4	4	**12**	5	**5**
70	178B1A0473	4	4	4	**12**	4	**5**
71	178B1A0474	4	4	4	**12**	5	**5**
72	178B1A0475	3	2	2	**7**	2	**5**
73	178B1A0476	1	0	0	**1**	3	**4**
74	178B1A0477	5	4	4	**13**	5	**5**
75	178B1A0478	5	5	5	**15**	5	**5**
76	178B1A0479	5	2	0	**7**	5	**5**
77	178B1A0480	2	1	0	**3**	3	**4**

78	178B1A0482	1	0	1	**2**	4	**4**
79	178B1A0483	4	4	3	**11**	4	**5**
80	178B1A0484	2	0	0	**2**	5	**4**
81	178B1A0485	4	5	4	**13**	5	**5**
82	178B1A0486	1	0	0	**1**	6	**4**
83	178B1A0487	5	5	5	**15**	6	**5**
84	178B1A0488	1	1	0	**2**	6	**4**
85	178B1A0489	2	1	1	**4**	6	**5**
86	178B1A0491	1	1	0	**2**	4	**4**
87	178B1A0492	0	0	0	**0**	2	**4**
88	178B1A0493	1	1	0	**2**	3	**4**
89	178B1A0494	2	2	3	**7**	5	**5**
90	178B1A0495	5	4	2	**11**	7	**5**
91	178B1A0496	1	4	0	**5**	4	**5**
92	178B1A0497	2	5	2	**9**	4	**5**
93	178B1A0498	0	0	0	**0**	3	**4**
94	178B1A0499	1	0	1	**2**	6	**4**
95	178B1A04A0	1	1	0	**2**	6	**4**
96	178B1A04A1	2	4	3	**9**	6	**5**
97	178B1A04A3	4	4	4	**12**	10	**5**
98	178B1A04A4	2	4	4	**10**	10	**5**
99	178B1A04A5	1	1	2	**4**	6	**4**
100	178B1A04A6	2	2	2	**6**	7	**5**
101	178B1A04A7	2	5	3	**10**	8	**5**
102	178B1A04B0	1	1	1	**3**	4	**4**
103	178B1A04B2	1	1	1	**3**	8	**4**
104	178B1A04B4	4	5	4	**13**	8	**5**
105	178B1A04B5	2	3	4	**9**	3	**5**
106	178B1A04B6	3	4	3	**10**	9	**5**
107	178B1A04B7	4	5	4	**13**	9	**5**
108	178B1A04B8	1	2	2	**5**	5	**4**
109	178B1A04B9	2	4	3	**9**	4	**5**
No. of students attempted		109	109	109		109	109
No. of students who got more than 60% marks		75	77	73		105	109
% of students who got more than 60% marks		68.81	70.64	66.97		96.33	100.00

Attainment Level	**3**	**3**	**3**		**3**	**3**
	CO1	**CO2**	**CO3**		**CO 1,2,3**	**CO 1,2,3**

Table 5.14: Sample Subjective %, Objective %, Assignment % Calculation

Continuous CO Improvement:

Identify the CO target by taking the average row wise in CO-PO mapping table.

Course code. CO number	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
C421.1	2	3	3		-		3	1	-	-	-	1	3	-
C421.2	2	2	3		-		3	2	-	-	-	1	3	
C421.3	2	2	3	2	-		3	-	-	-	-	1	3	
C421.4	2	3	1		-	2	3	1	-	2	-	1	3	-
C421.5	2	3	3	-	-		3	3	-	-	-	3	3	3
C421.6	2	3	3		-		3	-	-	-	1	1	3	1
C421 (Average)	2.17	2.67	2.67	2	-	2	3	1.75	-	-	1	1.33	3	2

Table 5.16: Sample calculation for CO target

- Identify the best CO attained and least CO attained based on CO assessment.
- Compare the present CO attained with target CO value.
- If present result is less than the target value then give the proposed plan of action for CO improvement.
- If Present result is greater than or equal to set target value then continue with same action plan**.**

Procedure for Laboratories:

Internal marks will be awarded for each lab for 25 marks These 25 marks will be evaluated based on the following parameters

- 10 Marks for Day to Day Evaluation.
- 5 Marks for Record
- 10 Marks for internal Examination.

Overall laboratory Marks will be awarded to students by adding internal marks and external marks.

Marks scored by the students are entered into internally developed Excel sheet to calculate LAB attainment.

Lab Outcome attainment (internal Examination)

Course Name: VLSI LAB Class: III ECE SEM II AY: 2021-22

Sl. No	Roll No	Day to Day Work	Record	Internal exam
		10M	5M	10M
1	188B1A0401	**9**	**5**	10
2	188B1A0402	**9**	**5**	8
3	188B1A0403	**9**	**5**	9
4	188B1A0404	**8**	**5**	0
5	188B1A0405	**9**	**5**	9
6	188B1A0406	**9**	**5**	10
7	188B1A0407	**10**	**5**	10
8	188B1A0408	**10**	**5**	10
9	188B1A0410	**9**	**5**	9
10	188B1A0411	**9**	**5**	10
11	188B1A0412	**9**	**5**	9
12	188B1A0413	**9**	**5**	9
13	188B1A0414	**9**	**5**	10
14	188B1A0415	**9**	**5**	9
15	188B1A0416	**9**	**5**	9
16	188B1A0417	**9**	**5**	10
17	188B1A0418	**10**	**5**	10
18	188B1A0419	**9**	**5**	9
19	188B1A0420	**9**	**5**	8
20	188B1A0421	**9**	**5**	9
21	188B1A0422	**9**	**0**	10
22	188B1A0424	**10**	**5**	10
23	188B1A0425	**9**	**5**	9
24	188B1A0426	**9**	**5**	9
25	188B1A0427	**9**	**5**	10
26	188B1A0428	**10**	**5**	10
27	188B1A0429	**9**	**5**	9

28	188B1A0430	**9**	**5**	9
29	188B1A0431	**9**	**5**	10
30	188B1A0432	**10**	**5**	10
31	188B1A0433	**9**	**5**	9
32	188B1A0434	**10**	**5**	10
33	188B1A0435	**9**	**5**	9
34	188B1A0436	**9**	**5**	10
35	188B1A0437	**9**	**5**	10
36	188B1A0438	**9**	**5**	9
37	188B1A0439	**9**	**5**	10
38	188B1A0440	**9**	**5**	10
39	188B1A0441	**9**	**5**	8
40	188B1A0442	**9**	**5**	10
41	188B1A0443	**9**	**5**	8
42	188B1A0444	**9**	**5**	9
43	188B1A0445	**9**	**5**	8
44	188B1A0446	**9**	**5**	9
45	188B1A0447	**10**	**5**	10
46	188B1A0448	**10**	**5**	10
47	188B1A0449	**10**	**5**	10
48	188B1A0450	**9**	**5**	8
49	188B1A0451	**9**	**5**	8
50	188B1A0452	**9**	**5**	10
51	188B1A0453	**9**	**5**	9
52	188B1A0454	**10**	**5**	10
53	188B1A0455	**9**	**5**	9
54	188B1A0456	**7**	**5**	0
55	188B1A0457	**9**	**5**	9
56	188B1A0458	**9**	**5**	8
57	188B1A0459	**10**	**5**	10
58	188B1A0461	**9**	**5**	10
59	188B1A0462	**9**	**5**	8
60	188B1A0463	**9**	**0**	10
61	188B1A0464	**9**	**5**	9
62	188B1A0465	**10**	**5**	10
63	188B1A0466	**9**	**5**	9
64	188B1A0467	**9**	**5**	8
65	188B1A0468	**9**	**5**	9
66	188B1A0469	**10**	**5**	10
67	188B1A0470	**10**	**5**	10
68	188B1A0471	**10**	**5**	10
69	188B1A0472	**9**	**5**	9
70	188B1A0473	**9**	**5**	10

71	188B1A0474	**10**	**5**	10
72	188B1A0475	**10**	**5**	10
73	188B1A0476	**9**	**5**	9
74	188B1A0477	**9**	**5**	9
75	188B1A0478	**9**	**5**	9
76	188B1A0479	**9**	**5**	8
77	188B1A0480	**9**	**5**	9
78	188B1A0481	**9**	**5**	9
79	188B1A0482	**9**	**5**	9
80	188B1A0484	**10**	**5**	10
81	188B1A0485	**9**	**5**	10
82	188B1A0486	**9**	**5**	8
83	188B1A0487	**8**	**5**	0
84	188B1A0488	**9**	**5**	10
85	188B1A0489	**9**	**5**	9
86	188B1A0490	**9**	**5**	10
87	188B1A0491	**9**	**5**	10
88	188B1A0492	**9**	**5**	10
89	188B1A0493	**9**	**5**	9
90	188B1A0494	**9**	**5**	9
91	188B1A0495	**9**	**5**	10
92	188B1A0496	**10**	**5**	10
93	188B1A0497	**9**	**5**	8
94	188B1A0498	**9**	**5**	8
95	188B1A0499	**9**	**5**	9
96	188B1A04A0	**9**	**5**	10
97	188B1A04A1	**9**	**5**	9
98	188B1A04A2	**9**	**5**	8
99	188B1A04A3	**9**	**5**	9
100	188B1A04A4	**10**	**5**	10
101	188B1A04A5	**10**	**5**	10
102	188B1A04A6	**9**	**5**	9
103	188B1A04A7	**9**	**5**	9
104	188B1A04A8	**9**	**5**	8
105	188B1A04B0	**9**	**5**	10
106	188B1A04B1	**9**	**5**	10
107	188B1A04B2	**9**	**5**	8
108	188B1A04B3	**9**	**5**	10
109	188B1A04B4	**9**	**5**	9
110	188B1A04B5	**9**	**5**	9
111	188B1A04B6	**9**	**5**	10
112	188B1A04B8	**8**	**5**	0
113	188B1A04B9	**9**	**5**	9

114	198B5A0401	**9**	**5**	9
115	198B5A0402	**9**	**5**	9
116	198B5A0403	**9**	**5**	9
117	198B5A0404	**9**	**5**	10
118	198B5A0405	**9**	**5**	9
119	198B5A0406	**9**	**5**	9
120	198B5A0407	**9**	**5**	9
121	198B5A0408	**9**	**5**	9
122	198B5A0409	**10**	**5**	10
123	198B5A0410	**9**	**5**	9
124	198B5A0411	**9**	**5**	10
125	198B5A0412	**9**	**5**	9
126	198B5A0413	**9**	**5**	9

Table 5.17: Sample internal marks sheet

From the above Excel sheet we can calculate the no. of students performed the experiments and no. of students who scored more than target marks for all experiments, percentage of students scored more the target will be calculated as follows.

PARAMETER	DAY TO DAY WORK	RECORD	INTERNAL EXAM
No. of students attempted	126	126	126
No. of students who got more than 60% marks	125	126	122
% of students who got more than 60% marks	100	100	97
Attainment Level	3	3	3
Over all level	3		

Table 5.18: Percentage of students scored above target for all

Experiments Each experiment was mapped to the relevant course outcome(s).

Expt No	Name of the experiment	COs Mapped
1	Design and Implementation of an Universal Gates	C327.1
2	Design and Implementation of an Inverter	C327.1
3	Design and Implementation of Full Adder	C327.2
4	Design and Implementation of Full Subtractor	C327.2
5	Design and Implementation of Decoder	C327.5
6	Design and Implementation of RS-Latch	C327.3
7	Design and Implementation of D-Latch	C327.3
8	Design and Implementation asynchronous counter	C327.4
9	Design and Implementation of static RAM cell	C327.4
10	Design and Implementation of 8 bit DAC using R-2R ladder network	C327.6
Additional experiments		
11	Design and Implementation of Multiplexer	C327.5
12	Design and Implementation of Encoder	C327.5

Table 5.19 CO Mapping with each Experiment

COURSE OUTCOME	Day-to-day Work	Record	Internal Exam	Overall
C327.1	3	3	3	3
C327.2	3	3	3	3
C327.3	3	3	3	3
C327.4	3	3	3	3
C327.5	3	3	3	3
C327.6	3	3	3	3

Table 5.20 Lab Internal Attainment

Lab End-Semester Examination Attainment:

Sl. No	Roll No	UNIV GRADE	UNIV GRADE POINT
1	188B1A0401	O	10
2	188B1A0402	S	9
3	188B1A0403	O	10
4	188B1A0404	AB	0
5	188B1A0405	O	10
6	188B1A0406	O	10
7	188B1A0407	O	10
8	188B1A0408	O	10
9	188B1A0410	O	10
10	188B1A0411	O	10
11	188B1A0412	O	10
12	188B1A0413	O	10
13	188B1A0414	O	10
14	188B1A0415	O	10
15	188B1A0416	O	10
16	188B1A0417	O	10
17	188B1A0418	O	10
18	188B1A0419	O	10
19	188B1A0420	O	10
20	188B1A0421	O	10
21	188B1A0422	O	10
22	188B1A0424	O	10
23	188B1A0425	O	10
24	188B1A0426	O	10
25	188B1A0427	O	10
26	188B1A0428	O	10
27	188B1A0429	O	10
28	188B1A0430	O	10
29	188B1A0431	O	10
30	188B1A0432	O	10
31	188B1A0433	O	10
32	188B1A0434	O	10
33	188B1A0435	O	10
34	188B1A0436	O	10
35	188B1A0437	O	10
36	188B1A0438	O	10
37	188B1A0439	O	10

38	188B1A0440	O	10
39	188B1A0441	O	10
40	188B1A0442	O	10
41	188B1A0443	S	9
42	188B1A0444	O	10
43	188B1A0445	S	9
44	188B1A0446	O	10
45	188B1A0447	O	10
46	188B1A0448	O	10
47	188B1A0449	O	10
48	188B1A0450	S	9
49	188B1A0451	O	10
50	188B1A0452	O	10
51	188B1A0453	O	10
52	188B1A0454	O	10
53	188B1A0455	O	10
54	188B1A0456	AB	0
55	188B1A0457	O	10
56	188B1A0458	O	10
57	188B1A0459	O	10
58	188B1A0461	O	10
59	188B1A0462	S	9
60	188B1A0463	O	10
61	188B1A0464	O	10
62	188B1A0465	O	10
63	188B1A0466	O	10
64	188B1A0467	S	9
65	188B1A0468	O	10
66	188B1A0469	O	10
67	188B1A0470	O	10
68	188B1A0471	O	10
69	188B1A0472	O	10
70	188B1A0473	O	10
71	188B1A0474	O	10
72	188B1A0475	O	10
73	188B1A0476	O	10
74	188B1A0477	O	10
75	188B1A0478	O	10
76	188B1A0479	O	10
77	188B1A0480	O	10
78	188B1A0481	O	10
79	188B1A0482	O	10
80	188B1A0484	O	10

81	188B1A0485	O	10
82	188B1A0486	S	9
83	188B1A0487	AB	0
84	188B1A0488	O	10
85	188B1A0489	O	10
86	188B1A0490	O	10
87	188B1A0491	O	10
88	188B1A0492	O	10
89	188B1A0493	O	10
90	188B1A0494	O	10
91	188B1A0495	O	10
92	188B1A0496	O	10
93	188B1A0497	O	10
94	188B1A0498	O	10
95	188B1A0499	O	10
96	188B1A04A0	O	10
97	188B1A04A1	O	10
98	188B1A04A2	O	10
99	188B1A04A3	O	10
100	188B1A04A4	O	10
101	188B1A04A5	O	10
102	188B1A04A6	O	10
103	188B1A04A7	O	10
104	188B1A04A8	O	10
105	188B1A04B0	O	10
106	188B1A04B1	O	10
107	188B1A04B2	O	10
108	188B1A04B3	O	10
109	188B1A04B4	O	10
110	188B1A04B5	O	10
111	188B1A04B6	O	10
112	188B1A04B8	AB	0
113	188B1A04B9	O	10
114	198B5A0401	O	10
115	198B5A0402	O	10
116	198B5A0403	O	10
117	198B5A0404	O	10
118	198B5A0405	O	10
119	198B5A0406	O	10
120	198B5A0407	O	10
121	198B5A0408	O	10
122	198B5A0409	O	10
123	198B5A0410	O	10

124	198B5A0411	**O**	**10**
125	198B5A0412	**O**	**10**
126	198B5A0413	**O**	**10**

Table 5.21 Lab External Grades obtained by Students

Parameter	End Examination
Total Students	126
Threshold Mark	40%
Above threshold Mark	122
Percentage of Students Scored Above threshold	97%
Attainment Level	3

Table 5.22: Lab End Exam Attainment

Overall attainment for labs will be calculated based on Internal and external marks scored by students.

HALL TICKET NO	**INTERNAL**	**EXTERNAL**
Total Students	126	126
Threshold Mark	60%	40%
Above threshold Mark	122	122
Percentage of Students Scored Above Average	97%	97%
Attainment Level	3	3

Table 5.23: Overall Lab CO Attainment

Procedure for Projects:

Project will be evaluated for 200 Marks of which 60 Marks will be evaluated by PRC (Project Review Committee) which consists of Project Guide, two senior faculty and HOD.

3 Reviews will be conducted for projects.

Consolidation of Evaluation:

After performance of team of students before the project review committee, marks are awarded for review -1, review-2 & review-3 as per their skill set, concept, understanding and way of presentation.After awarding the marks to the students as per above. The project coordinator collects the marks from all the guides and from the project review committee .The marks are displayed in the notice board by the project coordinator.

Internal Marks Consolidation:

In these 3 reviews marks are awarded by the chair person, project coordinator, and project guide. Review-1, review-2 and review 3 are taken into consideration and given for 60M as shown in the table below.

Indirect Method

CO Feedback:

- Each Course outcome is made as questionnaire in the student feedback form and students will fill the forms.
- At the end of the semester, Students feedback was collected for the course outcomes of the respective class. Analysis was carried out and the average feedback for each course outcome was calculated.

A sample feedback form screen shot for 4^{th} year 2^{nd} semester is shown below:

Course End Survey (Indirect Attainment)

Course: **B.Tech ECE** Year & Sem: IV-II Credits: **3**

Course Code: **C421** Regulation: **R16** Course Type: **Core**

Course Name: CMC AY: 2020-21

CO No	Rating			Total	Attainment	Attainment %
	1	2	3			
C421.1	0	26	98	124	2.79	93.01
C421.2	5	51	68	124	2.51	83.60
C421.3	3	47	74	124	2.57	85.75
C421.4	0	33	91	124	2.73	91.13
C421.5	4	28	92	124	2.71	90.32
C421.6	7	35	82	124	2.60	86.83

C421	C421.1	C421.2	C421.3	C421.4	C421.5	C421.6
	2.79	2.51	2.57	2.73	2.71	2.60
Indirect Course attainment						**2.65**

Table 5.27: Final Indirect CO Attainment

COURSE ASSESSMENT (PLAN & EXECUTION)

Regulation: R-19 **A.Y: 2021-22**

The assessment of course outcomes (COs) are categorized into two methods.

3. Direct Assessment method
4. Indirect Assessment method

Direct Assessment method:

The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory subject and 50 marks for practical subject. The project work shall be evaluated for 200 marks in 2 parts. Part-I is evaluated for 50 marks in VII- Semester and Part-II is evaluated for 150 marks in VIII-Semester.

The direct assessment methods along with their assessment criteria are given in below Table.1

Table.1 Direct assessment methods and description

S. No	Course	Assessment method	Frequency	Assessment criteria
1	**Theory Course (Internal assessment)**	Descriptive examinations	Twice in a semester	It is a metric to continuously assess the attainment of course outcomes, student's learning domains and thus improve the teaching –learning process. For theory subjects, during the semester there shall be 2 tests. The Weightage of Internal marks for 25 consists of Descriptive – 10, Assignment - 05, Objective -10 (Conducted at College level with 20 Multiple choice questions with a weightage of ½ Mark each). The objective examination is for 20 minutes duration. The subjective examination is for 90 minutes duration conducted for 10 marks. Each subjective type test question paper shall contain 3 questions and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 10 marks are to be added to the assignment marks of 5 for finalizing internal marks for 25. The addition of 80% of maximum internal marks from two tests and 20% from minimum internal marks will be taken for final internal marks. As the syllabus is framed for 5 units, the 1st mid examination (both Objective and Subjective) is conducted in first 2½ units and second test in remaining 2½ units of each subject in a semester.
		Objective examinations	Twice in a semester	
		Assignments	Twice in a semester	
	Theory Course (External assessment)	End semester examination	Once in a semester	The end semester examination is conducted covering the topics of all Units for 75 marks, consists of five questions carrying 15 marks each. Each of these questions is from

				one unit. for each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.
2	**Laboratory courses (Practical course)**	Continuous evaluation and record	Continuous	For practical subjects there shall be continuous evaluation during the semester for 20 internal marks and 30 end examination marks. The internal 20 marks shall be awarded as follows: continuous evaluation – 5 marks, Record-5 marks and the remaining 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner. The external 30 marks shall be awarded as follows: write-up – 10 marks, execution – 10 marks and viva-voce of 10 marks.
		Internal examination	Once in a semester	
		External examination	Once in a semester	

Course outcome assessment procedure for theory course:
The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 25% of Internal Assessment + 75% of External Assessment
Internal Assessment =10% of DESCRIPTIVE + 10% of OBJECTIVE + 5% of ASSIGNMENT

Course outcome assessment procedure for laboratory course:
The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 40% of Internal Assessment + 60% of External Assessment
Internal Assessment =10% of Continuous Evaluation + 10% of Record + 20% of Lab Internal Exam

Indirect Assessment method:

This method is based on student's knowledge and skills acquired from different types of courses.

The indirect assessment methods along with their assessment criteria are given in Table.2

Table.2 Indirect assessment methods and description

S. No	Type of component	Frequency	Assessment criteria
1	Course End Survey	Once at the end of semester	Collect information from the students to assess the course outcomes at the end of the semester.

CO Assessment = 80% of CO Direct Assessment + 20% CO Indirect Assessment

Internal Attainment:
Set Target: 60%

Attainment Level	Attainment Description
3	More than 60% number of students scoring more than the **set target** in internal assessment tools.
2	40-60 % number of students scoring more than the **set target** in internal assessment tools.
1	Less than 40% number of students scoring more than the **set target** in internal assessment tools.

External Attainment:

Set Target: SGPA-5

Attainment Level	Attainment Description
3	More than 60% number of students scoring more than the **set target** in External assessment tools.
2	40-60 % number of students scoring more than the **set target** in External assessment tools.
1	Less than 40% number of students scoring more than the **set target** in External assessment tools.

Assessment Tools Used for Theory Course:

- **Internal examination**
  - Descriptive Examinations
  - Objective Examinations
  - Assignments
- End Examination

Assessment Tools Used for Laboratory Course:

- Day to Day work (Continuous Evaluation)
- Record
- Internal Exam
  - Initial Procedure
  - Conduct of Experiment
  - Result/Graph
  - Viva-Voce
- End Examination

- Write-up
- Execution/Conduction
- Viva-Voce

- Assessment Procedure for Projects

1. Internal reviews by project review committee
2. University expert evaluation

Indirect method:

Indirect attainment process includes student's feedback on course outcome and assessment by using student feedback form.

Theory Courses Assessment (Direct method):

1. Descriptive Examination

Four subjective questions from each unit and total 12 questions will be sent to the examination branch and question paper will be given, among these 12 questions three questions will be selected by the exam branch in charge and 2 such examinations will be conducted for each course. Students should attempt three questions carrying 4,4,2 Marks.

Name of the Faculty: Mr.N.Nageswara Reddy **Course Name: ECA**

Year& Sem :II-I **Examination : I MID**

Course Code: C213 **Academic Year: 2020-21**

Q. NO.	QUESTION	CO NO.	TAXONOMY LEVEL	MARKS
1	a) Derive the expressions for the following hybrid Π conductance gm ii)gb'e iii) gb'c iv)gce	C221.1	Understanding	4
2	a) Derive expressions for Ri, Ro ,Av&Ai using h-parameter model of a CC- CE amplifier?	C221.2	Understanding	3
	b) Compare the three types of coupling methods used in multistage amplifiers.	C221.2	Remembering	1
3	Explain the concept of feedback with block diagram. What are the advantages and disadvantages of negative feedback?	C221.3	Understanding	2

Table 5.2: Sample Descriptive Question paper of Internal-1

SCHEME OF EVALUATION FOR II B.TECH I SEM MID-I

Q.No	Distribution of topic	Sub Marks	Total Marks
1a).	Define hybrid Π conductance i) gm ii)gb'e iii) gb'c iv)gce	2	4
1b).	expressions for the following hybrid Π conductance i) gm ii)gb'e iii) gb'c iv)gce	2	
2 a)	Expressions for Ri, Ro ,Av&Ai using h-parameter model of a CC- CE amplifier	2	4
2b)	Compare the three types of coupling methods used in multistage amplifiers	2	
3).	The concept of feedback with block diagram. What are the advantages and disadvantages of negative feedback	2	2

Marks scored by the students were entered into internally developed Excel sheet to calculate CO attainment.

Sl. No	Roll No	DESCRIPTIVE 1			
		Q1	Q2	Q3	Total
		4	4	2	
1	198B1A0401	3.0	3.0	1.0	**7**
2	198B1A0402	4.0	4.0	1.0	**9**
3	198B1A0404	4.0	4.0	1.0	**9**
4	198B1A0405	3.0	2.0	1.0	**6**
5	198B1A0406	A	A	A	**0**
6	198B1A0407	3.0	2.0	1.0	**6**
7	198B1A0408	4.0	4.0	1.0	**9**
8	198B1A0410	3.0	3.0	2.0	**8**
9	198B1A0411	A	A	A	**0**
10	198B1A0412	2.0	1.0	0.0	**3**
11	198B1A0413	3.0	2.0	1.0	**6**
12	198B1A0414	3.0	2.0	1.0	**6**
13	198B1A0415	3.0	2.0	1.0	**6**
14	198B1A0416	3.0	2.0	1.0	**6**

15	198B1A0417	3.0	2.0	1.0	**6**
16	198B1A0418	3.0	2.0	1.0	**6**
17	198B1A0419	3.0	2.0	1.0	**6**
18	198B1A0420	3.0	2.0	1.0	**6**
19	198B1A0419	3.0	2.0	1.0	**6**
20	198B1A0421	3.0	2.0	1.0	**6**
21	198B1A0422	A	A	A	**0**
22	198B1A0424	3.0	2.0	1.0	**6**
23	198B1A0425	3.0	2.0	1.0	**6**
24	198B1A0426	4.0	4.0	1.0	**9**
25	198B1A0427	3.0	2.0	1.0	**6**
26	198B1A0428	2.0	1.0	3.0	**6**
27	198B1A0429	3.0	3.0	1.0	**7**
28	198B1A0430	4.0	4.0	1.0	**9**
29	198B1A0431	3.0	2.0	1.0	**6**
30	198B1A0432	4.0	4.0	1.0	**9**
31	198B1A0433	3.0	2.0	1.0	**6**
32	198B1A0434	3.0	2.0	1.0	**6**
33	198B1A0436	3.0	2.0	1.0	**6**
34	198B1A0437	3.0	2.0	1.0	**6**
35	198B1A0438	A	A	A	**0**
36	198B1A0439	3.0	2.0	1.0	**6**
37	198B1A0440	3.0	2.0	1.0	**6**
38	198B1A0441	4.0	4.0	1.0	**9**
39	198B1A0442	4.0	4.0	1.0	**9**
40	198B1A0443	3.0	2.0	1.0	**6**
41	198B1A0444	3.0	2.0	1.0	**6**
42	198B1A0445	3.0	2.0	1.0	**6**
43	198B1A0446	A	A	A	**0**
44	198B1A0447	3.0	3.0	1.0	**7**
45	198B1A0448	4.0	4.0	1.0	**9**
46	198B1A0449	4.0	4.0	1.0	**9**
47	198B1A0450	3.0	2.0	1.0	**6**
48	198B1A0451	2.0	1.0	3.0	**6**
49	198B1A0452	3.0	3.0	1.0	**7**
50	198B1A0453	4.0	4.0	1.0	**9**
51	198B1A0454	4.0	4.0	1.0	**9**
52	198B1A0455	2.0	2.0	0.0	**4**
53	198B1A0456	3.0	2.0	1.0	**6**
54	198B1A0457	2.0	1.0	2.0	**5**
55	198B1A0458	3.0	0.0	2.0	**5**
56	198B1A0459	2.0	1.0	0.0	**3**
57	198B1A0460	2.0	2.0	0.0	**4**

58	198B1A0461	2.0	1.0	0.0	**3**
59	198B1A0462	3.0	3.0	1.0	**7**
60	198B1A0463	4.0	4.0	1.0	**9**
61	198B1A0464	4.0	4.0	1.0	**9**
62	198B1A0465	2.0	2.0	1.0	**5**
63	208B5A401	1.0	2.0	1.0	**4**
64	208B5A402	2.0	3.0	1.0	**6**
65	208B5A403	2.0	2.0	2.0	**6**
66	208B5A404	2.0	1.0	0.0	**3**
67	208B5A405	1.0	1.0	1.0	**3**
68	208B5A406	2.0	1.0	1.0	**4**

Table 5.3: Sample Descriptive mark

sheet From the above Excel sheet calculate the following.

1. The no. of students attempted the question,
2. Class threshold mark,
3. No. of students scored more than threshold marks for each question,
4. Percentage of students scored more than the threshold marks.

Course Outcome Attainment (Internal Examination-1)

S.NO	Parameter	Q1	Q2	Q3
1	Maximum Marks	4	4	2
2	Threshold marks	2.4	2.4	1.2
3	No. of students scored above Threshold mark	48	21	06
4	No. of students Attempted the question	63	63	63
5	Percentage of students scored above threshold mark	76.19	33.33	9.52
6	Attainment level	3	1	1

Table 5.4: Descriptive marks scored above threshold marks

CO Attainment based on Exams:

Attainment is calculated for each CO based on the questions given in the Internal Exam and the percentage of students scored above threshold marks.

CO No	MID-1	Q1	A1	MID-2	Q2	A2
C221.1	3	1	3	-	-	-
C221.2	1	1	3	-	-	-
C221.3	1	1	3	3	1	3
C221.4	-	-		2	1	3
C221.5	-	-		1	1	3

Table 5.5: CO attainment for internal exams

CO NO	MID-1	Quiz-1	Assignment-1	MID-2	Quiz-2	Assignment-2
C221.1	76.19	100	100			
C221.2	33.33	100	100			
C221.3	110	100	100			
C221.4				44.78	14.71	100.0
C221.5				10.45	14.71	100.0

Table 5.6.CO Attainment Percentage

In case multiple questions were asked for any CO, average was taken to calculate the percentage students attained that CO and overall course attainment for the internal examination is calculated.

Rubrics for Attainment:

1.If the average (i.e subj, obj, assignment) % of each Course outcome is in between 0-40% then it is considered as low attainment i.e 1(one)

2. If the average (i.e subj,obj,assignment) % of each Course outcome is in between 40%-60% then, it is considered as medium attainment i.e 2(Two)

3. If the average (i.e subj, obj, assignment) % of each Course outcome is >60% ,then it is considered as high attainment i.e 3(Three).

Attainment Level	
1	0<40%
2	40-60%
3	>60%

Table 5.7: Rubrics for Internal Attainment

1. Subjective Examination

One subjective question from each unit is given. Students need to write all questions, carrying 10 Marks. After finishing the mid exam, faculty concerned will evaluate the answers given by students and marks are awarded. Marks scored by the students are entered into internally developed Excel sheet to calculate CO attainment.

From the above Excel sheet calculate the no. of students attempted the question, threshold mark, no. of students scored more than threshold marks for each question, and Percentage of students scored more than the threshold marks.

2. Objective Examination

20 objective questions for each internal examination will be given by the university and 2 such examinations will be conducted for each course. Students need to attempt all questions, carrying

1.0 Marks each. Marks scored by the students will be entered into internally developed Excel sheet to calculate CO attainment.

From the Excel sheet we can calculate the no. of students attempted the online examination, threshold mark, no. of students scored more than threshold marks , percentage of students scored more than the threshold.CO mapping was done considering all 20 questions given in the examination (considering the CO's mapped in the subjective examination).

3. Assignment:

Four subjective questions for each unit are given. Students need to write all questions, carrying 5Marks.After submitting the assignment questions to the faculty concerned, marks are awarded to students. Marks scored by the students are entered into internally developed Excel sheet to calculate CO attainment.

From the above Excel sheet calculate the no. of students attempted the question, threshold mark, no. of students scored more than threshold marks for each question, and Percentage of students scored more than the threshold marks.

4. University Examination:

University Examinations will be conducted by JNTU-Kakinada at the end of each semester. After getting results from the university, the marks obtained by the students will be entered in internally developed assessment excel sheets to calculate the university attainment of respective subjects.

Sl. No	Roll No	UNIV GRADE	UNIV GRADE POINT
1	198B1A0401	S	**9**
2	198B1A0402	B	**7**
3	198B1A0404	A	**8**
4	198B1A0405	D	**5**
5	198B1A0406	C	**6**
6	198B1A0407	B	**7**
7	198B1A0408	C	**6**
8	198B1A0410	B	**7**
9	198B1A0411	F	**0**
10	198B1A0412	C	**6**
11	198B1A0413	B	**7**
12	198B1A0414	C	**6**
13	198B1A0415	C	**6**
14	198B1A0416	F	**0**
15	198B1A0417	B	**7**
16	198B1A0418	B	**7**
17	198B1A0419	B	**7**
18	198B1A0420	D	**5**
19	198B1A0419	C	**6**
20	198B1A0421	C	**6**
21	198B1A0422	S	**9**
22	198B1A0424	B	**7**
23	198B1A0425	B	**7**
24	198B1A0426	C	**6**
25	198B1A0427	C	**6**
26	198B1A0428	B	**7**
27	198B1A0429	D	**5**
28	198B1A0430	A	**8**
29	198B1A0431	B	**7**
30	198B1A0432	C	**6**
31	198B1A0433	B	**7**
32	198B1A0434	A	**8**
33	198B1A0436	C	**6**
34	198B1A0437	A	**8**
35	198B1A0438	B	**7**
36	198B1A0439	O	**10**
37	198B1A0440	B	**7**
38	198B1A0441	B	**7**

39	198B1A0442	F	**0**
40	198B1A0443	B	**7**
41	198B1A0444	C	**6**
42	198B1A0445	F	**0**
43	198B1A0446	C	**6**
44	198B1A0447	D	**5**
45	198B1A0448	D	**5**
46	198B1A0449	D	**5**
47	198B1A0450	F	**0**
48	198B1A0451	F	**0**
49	198B1A0452	F	**0**
50	198B1A0453	F	**0**
51	198B1A0454	F	**0**
52	198B1A0455	C	**6**
53	198B1A0456	D	**5**
54	198B1A0457	F	**0**
55	198B1A0458	F	**0**
56	198B1A0459	F	**0**
57	198B1A0460	C	**6**
58	198B1A0461	C	**6**
59	198B1A0462	C	**6**
60	198B1A0463	S	**9**
61	198B1A0464	B	**7**
62	198B1A0465	F	**0**
63	208B5A401	C	**6**
64	208B5A402	C	**6**
65	208B5A403	F	**0**
66	208B5A404	A	**8**
67	208B5A405	F	**0**
68	208B5A406	A	**8**

Table 5.8: University Grade & Grade Point obtained for External attainment

Attainment Level	Percentage students
1	0-40%
2	40-60%
3	>60%

Table 5.9: Rubrics for External attainment

External attainment level can be calculated based on % of students who scored more than the threshold marks as given below.

Total no. of students performed above target / Total no. of students attended.

S.NO	Parameter	University
1	Maximum Grade	10
2	Class Threshold marks	24
3	No. of students scored above threshold	53
4	No. of students Appeared	68
5	Percentage of students scored above threshold	77.94
6	Class threshold level of attainment	3

Table5.10: External marks scored above threshold marks

Course Attainment Calculations:

Attainment was calculated and each CO was given same attainment considering all questions. Overall Course Attainment Level = 60% (Average Internal Attainment) + 40% (Average University Attainment).

Internal & University Attainment:	3.00	3.00
Weightage	60%	40%
CO Attainment for the course (Internal, University)	3.00	3.00
CO Attainment for the course (Direct Method)	2.66	

Table5.11: Sample Overall Course Attainment Level

1. Average Internal Attainment is obtained from average of all CO's attainment for Internal Exam
2. Average University Attainment is obtained from average of all CO's attainment for university exam.

CO No.	Course Outcomes(COs)	BTL
C221.1	Design small signal high frequency amplifier circuits by using BJT and FET.	Applying
C221.2	Design of multi stage amplifiers using BJT & FET.	Applying

C221.3	Apply the concept of feedback to various types of amplifier circuits.	Applying
C221.4	Apply the principle of oscillations to different types of oscillator circuits.	Applying
C221.5	Analyze different power amplifiers and tuned amplifiers based on their performance.	Analyzing
Overall Attainment=2.46		

Table 5.12: Sample Average Internal & External Attainment

3. CO attainment Level is obtained from Mid Exams which is of three Levels, based on percentage obtained by taking

(Subj *10% + Obj*10 %+Assign*5% + Uni*75 %)

Table 5.13: Sample CO attainment Level

CO NO	Mid-1 attainment level	Quiz-1 attainment level	Assignment-1 attainment level	Mid-2 attainment level	Quiz-2 attainment level	Assignment-2 attainment level	University exam attainment level	Overall
C221.1	3	1	3				3	2.80
C221.2	1	1	3				3	2.60
C221.3	1	1	3				3	2.60
C221.3				3	1	3	3	2.25
C221.4				2	1	3	3	2.25
C221.5				1	1	3	3	2.25
Direct Course attainment								**2.46**

Table 5.13: Sample CO attainment Level

1. Subjective % , Objective % , Assignment % is calculated based on the number of students who attempted the question and scored more than target % for the corresponding course.

Sl. No	Roll No	DESCRIPTIVE 1				Quiz 1	Assign 1
		Q1	Q2	Q3	Total	10	5
		4	4	2			
1	198B1A0401	3.0	3.0	1.0	**7**	**5**	**5**
2	198B1A0402	4.0	4.0	1.0	**9**	**5**	**5**
3	198B1A0404	4.0	4.0	1.0	**9**	**7**	**5**

4	198B1A0405	3.0	2.0	1.0	**6**	**3**	**5**
5	198B1A0406	A	A	A	**0**	**4**	**5**
6	198B1A0407	3.0	2.0	1.0	**6**	**6**	**5**
7	198B1A0408	4.0	4.0	1.0	**9**	**4**	**5**
8	198B1A0410	3.0	3.0	2.0	**8**	**2**	**5**
9	198B1A0411	A	A	A	**0**	**4**	**5**
10	198B1A0412	2.0	1.0	0.0	**3**	**3**	**5**
11	198B1A0413	3.0	2.0	1.0	**6**	**3**	**5**
12	198B1A0414	3.0	2.0	1.0	**6**	**4**	**5**
13	198B1A0415	3.0	2.0	1.0	**6**	**3**	**5**
14	198B1A0416	3.0	2.0	1.0	**6**	**1**	**5**
15	198B1A0417	3.0	2.0	1.0	**6**	**4**	**5**
16	198B1A0418	3.0	2.0	1.0	**6**	**6**	**5**
17	198B1A0419	3.0	2.0	1.0	**6**	**4**	**5**
18	198B1A0420	3.0	2.0	1.0	**6**	**2**	**5**
19	198B1A0419	3.0	2.0	1.0	**6**	**4**	**5**
20	198B1A0421	3.0	2.0	1.0	**6**		**5**
21	198B1A0422	A	A	A	**0**	**3**	**5**
22	198B1A0424	3.0	2.0	1.0	**6**	**3**	**5**
23	198B1A0425	3.0	2.0	1.0	**6**	**4**	**5**
24	198B1A0426	4.0	4.0	1.0	**9**	**3**	**5**
25	198B1A0427	3.0	2.0	1.0	**6**	**4**	**5**
26	198B1A0428	2.0	1.0	3.0	**6**	**5**	**5**
27	198B1A0429	3.0	3.0	1.0	**7**	**3**	**5**
28	198B1A0430	4.0	4.0	1.0	**9**	**4**	**5**
29	198B1A0431	3.0	2.0	1.0	**6**	**4**	**5**
30	198B1A0432	4.0	4.0	1.0	**9**	**3**	**5**
31	198B1A0433	3.0	2.0	1.0	**6**	**4**	**5**
32	198B1A0434	3.0	2.0	1.0	**6**	**3**	**5**
33	198B1A0436	3.0	2.0	1.0	**6**	**1**	**5**
34	198B1A0437	3.0	2.0	1.0	**6**	**3**	**5**
35	198B1A0438	A	A	A	**0**	**2**	**5**
36	198B1A0439	3.0	2.0	1.0	**6**	**4**	**5**
37	198B1A0440	3.0	2.0	1.0	**6**	**3**	**5**
38	198B1A0441	4.0	4.0	1.0	**9**	**3**	**5**
39	198B1A0442	4.0	4.0	1.0	**9**	**5**	**5**
40	198B1A0443	3.0	2.0	1.0	**6**	**4**	**5**
41	198B1A0444	3.0	2.0	1.0	**6**	**1**	**5**
42	198B1A0445	3.0	2.0	1.0	**6**	**2**	**5**
43	198B1A0446	A	A	A	**0**	**3**	**5**
44	198B1A0447	3.0	3.0	1.0	**7**	**2**	**5**
45	198B1A0448	4.0	4.0	1.0	**9**	**3**	**5**
46	198B1A0449	4.0	4.0	1.0	**9**	**4**	**5**

47	198B1A0450	3.0	2.0	1.0	**6**	**5**	**5**
48	198B1A0451	2.0	1.0	3.0	**6**	**3**	**5**
49	198B1A0452	3.0	3.0	1.0	**7**	**3**	**5**
50	198B1A0453	4.0	4.0	1.0	**9**	**4**	**5**
51	198B1A0454	4.0	4.0	1.0	**9**	**4**	**5**
52	198B1A0455	2.0	2.0	0.0	**4**	**3**	**5**
53	198B1A0456	3.0	2.0	1.0	**6**	**6**	**5**
54	198B1A0457	2.0	1.0	2.0	**5**	**3**	**5**
55	198B1A0458	3.0	0.0	2.0	**5**	**4**	**5**
56	198B1A0459	2.0	1.0	0.0	**3**	**4**	**5**
57	198B1A0460	2.0	2.0	0.0	**4**	**3**	**5**
58	198B1A0461	2.0	1.0	0.0	**3**	**4**	**5**
59	198B1A0462	3.0	3.0	1.0	**7**	**4**	**5**
60	198B1A0463	4.0	4.0	1.0	**9**	**4**	**5**
61	198B1A0464	4.0	4.0	1.0	**9**	**4**	**5**
62	198B1A0465	2.0	2.0	1.0	**5**	**4**	**5**
63	208B5A401	1.0	2.0	1.0	**4**	**4**	**5**
64	208B5A402	2.0	3.0	1.0	**6**	**2**	**5**
65	208B5A403	2.0	2.0	2.0	**6**	**4**	**5**
66	208B5A404	2.0	1.0	0.0	**3**	**4**	**5**
67	208B5A405	1.0	1.0	1.0	**3**	**3**	**5**
68	208B5A406	2.0	1.0	1.0	**4**	**4**	**5**
No. of students attempted		63	63	63		67	68
No. of students who got more than 60% marks		48	21	6		4	68
% of students who got more than 60% marks		76.19	33.33	9.52		5.97	100.00
Attainment Level		**3**	**1**	**1**		**1**	**3**
		CO1	**CO2**	**CO3**		**CO 1,2,3**	**CO 1,2,3**

Table 5.14: Sample Subjective %, Objective %, Assignment % Calculation

Continuous CO Improvement:

➢ Identify the CO target by taking the average row wise in CO-PO mapping table.

Course code. CO number	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C221.1	3	3	2	2	-	-	-	-	-	-	-	1	2	2
C221.2	3	3	2	2	-	-	-	-	-	-	-	1	2	2
C221.3	3	3	3	3	-	-	2	-	-	-	-	1	2	2
C221.4	3	3	2	2	-	-	-	-	-	-	-	1	2	2
C221.5	3	3	3	3	-	-	-	-	-	-	-	1	2	2
C221.6	3	3	3	3	-	-	-	2	-	-	-	1	2	2
C211(Average)	3	3	2.5	1.667	-	-	2	2	-	-	-	1	2	2

Table 5.16: Sample calculation for CO target

- Identify the best CO attained and least CO attained based on CO assessment.
- Compare the present CO attained with target CO value.
- If present result is less than the target value then give the proposed plan of action for CO improvement.
- If Present result is greater than or equal to set target value then continue with same action plan**.**

Procedure for Laboratories:

Internal marks will be awarded for each lab for 25 marks

These 25 marks will be evaluated based on the following parameters

- 10 Marks for Day to Day Evaluation.
- 5 Marks for Record
- 10 Marks for internal Examination.

Overall laboratory Marks will be awarded to students by adding internal marks and external marks.

Marks scored by the students are entered into internally developed Excel sheet to calculate LAB attainment.

Lab Outcome attainment (Internal Examination)

Course Name: ECA LAB Class: II ECE SEM II AY: 2021-22
Regulation : R19

Sl. No	Roll No	Day to Day Work	Record	Internal exam
		5M	5M	10M
1	198B1A0401	5	5	10
2	198B1A0402	5	5	9
3	198B1A0404	5	5	9
4	198B1A0405	5	5	9
5	198B1A0406	5	5	9
6	198B1A0407	5	5	8
7	198B1A0408	5	5	9
8	198B1A0410	5	5	8
9	198B1A0411	5	5	9
10	198B1A0412	5	5	9
11	198B1A0413	5	5	9
12	198B1A0414	5	5	9
13	198B1A0415	5	5	9
14	198B1A0416	5	5	9
15	198B1A0417	5	5	9
16	198B1A0418	5	5	9
17	198B1A0419	5	5	8
18	198B1A0420	5	5	10
19	198B1A0419	5	5	8
20	198B1A0421	5	5	8
21	198B1A0422	5	5	9
22	198B1A0424	5	5	8
23	198B1A0425	5	5	9
24	198B1A0426	5	5	8
25	198B1A0427	5	5	9
26	198B1A0428	5	5	8
27	198B1A0429	5	5	9
28	198B1A0430	5	5	8
29	198B1A0431	5	5	9
30	198B1A0432	5	5	8
31	198B1A0433	5	5	9

32	198B1A0434	5	5	7
33	198B1A0436	5	5	7
34	198B1A0437	5	5	7
35	198B1A0438	5	5	7
36	198B1A0439	5	5	7
37	198B1A0440	5	5	8
38	198B1A0441	5	5	8
39	198B1A0442	5	5	8
40	198B1A0443	5	5	8
41	198B1A0444	5	5	9
42	198B1A0445	5	5	9
43	198B1A0446	5	5	9
44	198B1A0447	5	5	9
45	198B1A0448	5	5	9
46	198B1A0449	5	5	9
47	198B1A0450	5	5	9
48	198B1A0451	5	5	9
49	198B1A0452	5	5	8
50	198B1A0453	5	5	9
51	198B1A0454	5	5	8
52	198B1A0455	5	5	9
53	198B1A0456	5	5	7
54	198B1A0457	5	5	7
55	198B1A0458	5	5	7
56	198B1A0459	5	5	7
57	198B1A0460	5	5	7
58	198B1A0461	5	5	8
59	198B1A0462	5	5	8
60	198B1A0463	5	5	8
61	198B1A0464	5	5	8
62	198B1A0465	5	5	9
63	208B5A401	5	5	9
64	208B5A402	5	5	9
65	208B5A403	5	5	9
66	208B5A404	5	5	6
67	208B5A405	5	5	6
68	208B5A406	5	5	7

Table 5.17: Sample internal marks sheet

From the above Excel sheet we can calculate the no. of students performed the experiments and no. of students who scored more than target marks for all experiments, percentage of students scored more the target will be calculated as follows.

PARAMETER	DAY TO DAY WORK	RECORD	INTERNAL EXAM
No. of students attempted	68	68	68
No. of students who got more than 60% marks	68	68	68
% of students who got more than 60% marks	100	100	100
Attainment Level	3	3	3
Over all level	3		

Table 5.18: Percentage of students scored above target for all Experiments

Each experiment was mapped to the relevant course outcome(s).

Expt No	Name of the experiment	COs Mapped
1	Determination of f_T of a given transistor	C227.1
2	Voltage-Series Feedback Amplifier	C227.1, C227.2
3	Current-Shunt Feedback Amplifier	C227.1, C227.2
4	RC Phase Shift Oscillator	C227.1, C227.2
5	Colpitt's Oscillator	C227.4
6	Two Stage RC Coupled Amplifier	C227.1, C227.2
7	Darlington Pair Amplifier	C227.4
8	Class A Series-fed Power Amplifier	C227.4
9	Complementary Symmetry Class B Push-Pull Power Amplifier	C227.1, C227.6
10	Single Tuned Voltage Amplifier	C227.1, C227.6
11	Clapp Oscillator	C227.3
12	Differential Amplifier	**C227**

Table 5.19 CO Mapping with each Experiment

COURSE OUTCOME	Day-to-day Work	Record	Internal Exam	Overall
C227.1	3	3	3	3
C227.2	3	3	3	3
C227.3	3	3	3	3
C227.4	3	3	3	3
C227.5	3	3	3	3
C227.6	3	3	3	3

Table 5.20 Lab Internal Attainment

Lab End-Semester Examination Attainment:

Sl. No	Roll No	UNIV GRADE	UNIV GRADE POINT
1	198B1A0401	O	10
2	198B1A0402	O	10
3	198B1A0404	O	10
4	198B1A0405	O	10
5	198B1A0406	O	10
6	198B1A0407	O	10
7	198B1A0408	O	10
8	198B1A0410	O	10
9	198B1A0411	O	10
10	198B1A0412	O	10
11	198B1A0413	O	10
12	198B1A0414	O	10
13	198B1A0415	O	10
14	198B1A0416	O	10
15	198B1A0417	O	10
16	198B1A0418	O	10
17	198B1A0419	O	10
18	198B1A0420	O	10
19	198B1A0419	S	9
20	198B1A0421	O	10
21	198B1A0422	O	10
22	198B1A0424	O	10
23	198B1A0425	O	10
24	198B1A0426	O	10
25	198B1A0427	S	9
26	198B1A0428	O	10
27	198B1A0429	O	10
28	198B1A0430	O	10

29	198B1A0431	O	10
30	198B1A0432	O	10
31	198B1A0433	O	10
32	198B1A0434	O	10
33	198B1A0436	O	10
34	198B1A0437	O	10
35	198B1A0438	O	10
36	198B1A0439	O	10
37	198B1A0440	O	10
38	198B1A0441	O	10
39	198B1A0442	O	10
40	198B1A0443	S	9
41	198B1A0444	O	10
42	198B1A0445	O	10
43	198B1A0446	S	10
44	198B1A0447	O	10
45	198B1A0448	O	10
46	198B1A0449	S	9
47	198B1A0450	S	9
48	198B1A0451	O	10
49	198B1A0452	S	9
50	198B1A0453	S	9
51	198B1A0454	S	9
52	198B1A0455	O	10
53	198B1A0456	O	10
54	198B1A0457	O	10
55	198B1A0458	O	10
56	198B1A0459	S	9
57	198B1A0460	O	10
58	198B1A0461	O	10
59	198B1A0462	S	10
60	198B1A0463	O	10
61	198B1A0464	O	10
62	198B1A0465	O	10
63	208B5A401	O	10
64	208B5A402	O	10
65	208B5A403	O	10
66	208B5A404	O	10
67	208B5A405	O	10
68	208B5A406	O	10

Table 5.21 Lab External Grades obtained by Students

Parameter	End Examination
Total Students	68
Threshold Mark	40%
Above threshold Mark	68
Percentage of Students Scored Above threshold	100
Attainment Level	3

Table 5.22: Lab End Exam Attainment

Overall attainment for labs will be calculated based on Internal and external marks scored by students.

HALL TICKET NO	**INTERNAL**	**EXTERNAL**
Total Students	68	68
Threshold Mark	60%	40%
Above threshold Mark	68	68
Percentage Of Students Scored Above Average	100.0	100.0
Attainment Level	3	3

Table 5.23: Overall Lab CO Attainment

Procedure for projects:

Project will be evaluated for 200 Marks of which 60 Marks will be evaluated by PRC (Project Review Committee) which consists of Project Guide, two senior faculty and HOD.

3 Reviews will be conducted for projects.

Consolidation of Evaluation:

After performance of team of students before the project review committee, marks are awarded for review -1, review-2 & review-3 as per their skill set, concept, understanding and way of presentation.After awarding the marks to the students as per above. The project coordinator collects the marks from all the guides and from the

project review committee .The marks are displayed in the notice board by the project coordinator.

Internal Marks Consolidation:

In these 3 reviews marks are awarded by the chair person, project coordinator, and project guide. Review-1, review-2 and review 3 are taken into consideration and given for 60M

- Complete knowledge of proposed system is expected
- Power Point Presentation which describes
  - Objective of the project
  - Existing System
  - Proposed System
  - Maximum 15 Slides
  - 5 minutes for Presentation and 2 minutes for Queries for each Batch
- Subsection Identification (Project Modules)
- Action Plan for the date of Completion for each Module
- Each Group is required to make a project report showing the end of the project with Results.
- This report should be signed by the HOD and internal Guide and should be submitted for final presentation before External Examiner.

Indirect Method

CO Feedback:

- Each Course outcome is made as questionnaire in the student feedback form and students will fill the forms.

At the end of the semester, Students feedback was collected for the course outcomes of the respective class. Analysis was carried out and the average feedback for each course outcome was calculated

COURSE ASSESSMENT (PLAN & EXECUTION)

Regulation: R-20 **A.Y: 2021-22**

The assessment of course outcomes (COs) are categorized into two methods.

5. Direct Assessment method
6. Indirect Assessment method

Direct Assessment method:

The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory subject and 50 marks for practical subject. The project work shall be evaluated for 200 marks.

The direct assessment methods along with their assessment criteria are given in below Table.1

Table.1 Direct assessment methods and description

S. No	Course	Assessment method	Frequency	Assessment criteria
1	**Theory Course (Internal assessment)**	Descriptive examinations	Twice in a semester	It is a metric to continuously assess the attainment of course outcomes, student's learning domains and thus improve the teaching –learning process. For theory subjects, during the semester there shall be 2 tests. The Weightage of Internal marks for 30 consists of Descriptive – 15, Assignment - 05, Objective -10 (Conducted at College level with 20 Multiple choice questions with a weightage of ½ Mark each). The objective examination is for 20 minutes duration. The subjective examination is for 90 minutes duration conducted for 15 marks. Each subjective type test question paper shall contain 3 questions and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 15 marks are to be added to the assignment marks of 5 for finalizing internal marks for 30. The addition of 80% of maximum internal marks from two tests and 20% from minimum internal marks will be taken for final internal marks. As the syllabus is framed for 5 units, the 1st mid examination (both Objective and Subjective) is conducted in first 2½ units and second test in remaining 2½ units of each subject in a semester.
		Objective examinations	Twice in a semester	
		Assignments	Twice in a semester	
	Theory Course (External assessment)	End semester examination	Once in a semester	The end semester examination is conducted covering the topics of all Units for 70 marks, consists of five questions carrying 14 marks each. Each of these questions is from one unit. for each question there will be an

				"either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.
2	**Laboratory courses (Practical course)**	Continuous evaluation and record	Continuous	For practical subjects there shall be continuous evaluation during the semester for 15 internal marks and 35 end examination marks. The internal 15 marks shall be awarded as follows: continuous evaluation – 5 marks, Record-5 marks and the remaining 5 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner. The external 35 marks shall be awarded as follows: write-up – 15 marks, execution – 15 marks and viva-voce of 5 marks.
		Internal examination	Once in a semester	
		External examination	Once in a semester	

Course outcome assessment procedure for theory course:
The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 30% of Internal Assessment + 70% of External Assessment
Internal Assessment =15% of DESCRIPTIVE + 10% of OBJECTIVE + 5% of ASSIGNMENT

Course outcome assessment procedure for laboratory course:
The course outcomes are assessed using the following generalized formula

CO Direct Assessment = 30% of Internal Assessment + 70% of External Assessment
Internal Assessment =10% of Continuous Evaluation + 10% of Record + 10% of Lab Internal Exam

Indirect Assessment method:

This method is based on student's knowledge and skills acquired from different types of courses.

The indirect assessment methods along with their assessment criteria are given in Table.2

Table.2 Indirect assessment methods and description

S. No	Type of component	Frequency	Assessment criteria
1	Course End Survey	Once at the end of semester	Collect information from the students to assess the course outcomes at the end of the semester.

CO Assessment = 80% of CO Direct Assessment + 20% CO Indirect Assessment

Internal Attainment:

Set Target: 60%

Attainment Level	Attainment Description

3	More than 60% number of students scoring more than the **set target** in internal assessment tools.
2	40-60 % number of students scoring more than the **set target** in internal assessment tools.
1	Less than 40% number of students scoring more than the **set target** in internal assessment tools.

External Attainment:

Set Target: SGPA-5

Attainment Level	Attainment Description
3	More than 60% number of students scoring more than the **set target** in External assessment tools.
2	40-60 % number of students scoring more than the **set target** in External assessment tools.
1	Less than 40% number of students scoring more than the **set target** in External assessment tools.

Assessment Tools Used for Theory Course:

- **Internal examination**
  - Descriptive Examinations
  - Objective Examinations
  - Assignments
- End Examination

Assessment Tools Used for Laboratory Course:

- Day to Day work (Continuous Evaluation)
- Record
- Internal Exam
  - Initial Procedure
  - Conduct of Experiment
  - Result/Graph
  - Viva-Voce
- End Examination
  - Write-up
  - Execution/Conduction
  - Viva-Voce
- Assessment Procedure for Projects
  1. Internal reviews by project review committee

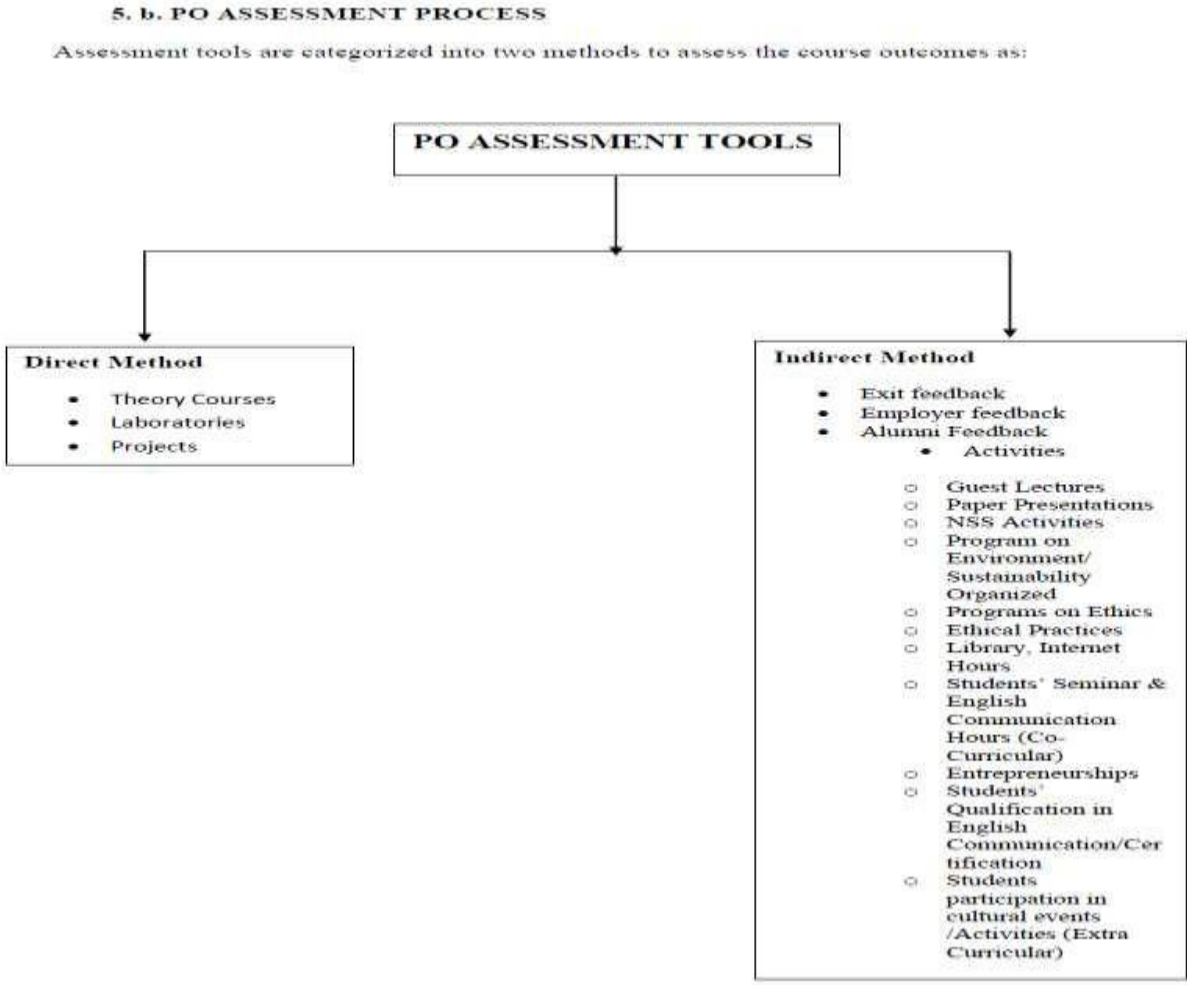
2. University expert evaluation

Indirect method:

Indirect attainment process includes student's feedback on course outcome and assessment by using student feedback form.

6. PO ASSESSMENT PROCESS

Assessment tools are categorized into two methods to assess the course outcomes as:



Tools Used for PO Attainment

- Course work attainments
- Laboratories attainments
- Project work attainments
- activities attainments
- Alumni Feedback
- Exit student feedback
- Employer feedback

PO Attainment from Course Work:

Course work attainment is calculated separately for internal, external and university examinations considering the percentage number of students scoring above threshold marks and the CO attainment level is calculated according to the Rubric given. PO attainment is calculated by using this CO attainment level and respective CO-PO mapping average of the course work.

Ex: PO attainment=CO attainment level* CO-PO mapping average/3. Sample for PO attainment calculation is shown below:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C421	2.17	2.67	2.67	2	-	2	3	1.75	-	2	1	1.33	3	2

Table 6.1: CO-PO Mapping for a Course: CMC

C421	C421.1	C421.2	C421.3	C421.4	C421.5	C421.6
	2.98	2.95	2.96	2.97	2.97	2.96
Course Attainment(C221)						2.97

Table 6.2: CO Attainment Table for a Course: CMC

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C421	2.14	2.64	2.64	1.98	-	1.98	2.97	1.73	-	1.98	0.99	1.31	2.97	1.98

Table 6.3: PO Attainment for a course: CMC

PO Attainment from Laboratories:

Lab work attainment is calculated separately for internal, external and university examinations considering the percentage number of students scoring above threshold and the CO attainment level is calculated according to the rubric given. The procedure for PO attainment calculation is the same as for Laboratories.

PO Attainment from Project:

Project work attainment is calculated by finding out the average of CO-PO mapping for all the project batches.

Use of Rubrics for Evaluation and Assessment of POs

The Program Outcomes are difficult to measure such as assessing critical thinking, creativity, analytical skills, and problem solving etc. Hence the department has adopted some rubrics.Criterion Referenced Rubrics to assess the POs and COs wherever appropriate. The Rubric criteria are either developed by Department faculty or sometimes even with consultation with students and distributed before an assignment, project or test. Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.

The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weightage.

Assessment of CO/Extra Curricular activities and students participation:

All activities organized by various committees were used to calculate the attainments. PO attainment from each activity is calculated using the following methodology.

Rubrics for CO/Extra Curricular activities:

		Poor (1)	Satisfactory (2)	Good (3)	Program/Event Details	Assessment
1	Guest Lecturers (Co-Curricular)	Program organizes 1-2 Guest Lecturers	Program Organizes 3-4 Lecturers	Program Organizes 5 or more Guest Lecturers	0	0.00
2	Add-on Courses (Co-Curricular)	Program organized 1 Add-on	Program organized 2 Add-on	Program organized	3	3.00
		Program	Program	3 or More Add-on Program		
3	Projects Exhibition (Co-Curricular)	No Project Exhibitions	Every Year	Every Semester	Every Yr	2.00
4	Paper Presentations (Co-Curricular)	Nil	Every Year	Every Semester	Every Yr	2.00

5	NSS Activities (Extra-Curricular)	Less than 25% Program Students' Participate	26-50% Students Participate	Above 50% Students' Participate	Above 50%	3.00
6	Program on Environment/ Sustainability Organized (Co-Curricular)	Nil	1-2 Programs	More Programs	1-2	2.00
7	Programs on Ethics (Co-Curricular)	Nil	1-2 Programs	More Programs	1-2	2.00
8	Ethical Practices – Like Honesty Shops, Yoga, etc., (Extra-Curricular)	Nil	1-2 Practices	More Practices	1-2	2.00
9	Project Management & Finance Guest Lecturers (Co-Curricular)	Nil	1-2 Lecturers	More Lecturers	Nil	0.00
10	Library, Internet Hours (Co-Curricular)	Nil	Lib or Internet	Both	Both	3.00
11	Students' Seminar & English Communication Hours (Co-Curricular)	Nil	Either	Both	Both	3.00

12	Entrepreneurships – Lecturers (Co-Curricular)	Nil	1-2 Lecturers	More Lecturers	Nil	0.00
13	Students' Qualification in English Communication/Certification (Co-Curricular)	Nil	25%-50% Students	Above 50% Students	Nil	0.00
15	Programs on Health or Course on Human Anatomy	Nil	1-2 Programs	More Programs	1 Program	2.00
16	Programs on Safety Engineering	Nil	1-2 Programs	More Programs	1 Program	2.00
17	Programs on Intellectual Property Rights	Nil	1-2 Programs	More Programs	1 Program	2.00
18	Programs on Business Laws	Nil	1-2 Programs	More Programs	Nil	0.00

19	Students' Participation in Cultural Events, Activities	10-25%	26%-50%	51% & Above	51% & Above	3.00

Table 6.4: Parameters taken for Assessment of co/extra-curricular activities

Parameters for Exit student feedback:

Parameter
RISE graduates comparison with graduates from other institutes
Grade to describe RISE and its graduates
Communication Skills
Technical knowledge
Life Skills
facilities
Academic initiatives
grievances handled
workshops /conferences/seminars/industrial visits/quality improvement
of career counseling and guidance for higher studies
support extended personality development
Administration and staff
Exam cell
Infrastructure
Library
Laboratory
Discipline
Environment
Canteen
Computer facilities
Counseling/ mentoring facilities

gym facilities
Cultural Activities (CARNIVAL-2K18)
Annual Project Exhibition (CARNIVAL-2K18)
Technical Paper & Poster presentation (CARNIVAL-2K18)
Technical Quiz (CARNIVAL-2K18)
Overall Experience at RISE
Overall Experience at RISE

Table 6.5: Parameters taken for Assessing exit student feedback

Parameters of Employer feedback:

Description
RISE graduates comparison with graduates from other institutes
Grade to describe RISE and its graduates
Communication Skills
Technical knowledge
Life Skills
support extended personality development
Administration
Discipline
Environment
Overall Experience at RISE

Table 6.6: Parameters taken for Assessing Employer feedback

Annexure

RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS::ONGOLE
(Approved by AICTE-NEW DELHI, Affiliated to JNTUK KAKINADA)
NH-16, Valluru-523272, Ongole, Prakasam (District), A.P

INTERNAL QUALITY ASSURANCE CELL (IQAC)

EMPLOYER FEEDBACK FORM

Employer Name:	**Academic Year:**
Name of the Organization:	**Designation:**

Please rate your valuable feedback on the curriculum for the review of syllabus / to improve the quality of programme.

S.No	Question	Excellent	Very Good	Good	Average	Poor
1	Rate the Curriculum's relevance for employability.					
2	Rate the appropriate sequence of the course provided in the curriculum.					
3	Rate the Curriculum's effectiveness in developing innovative thinking.					
4	Rate the Syllabus as effective in developing skill-oriented human resources.					
5	Rate the Effectiveness of curriculum for the development of entrepreneurship					
6	How do you rate the applicability of the domains and the tools used for designing the experiments in terms of existing practices in the Industry?					
7	How do you rate the experiments in terms of their relevance to the real-life application?					
8	How do you rate the relevance of the topics to Industry?					
9	How do you rate the proficiency of our students working with you?					

Any other suggestions: _____

_____

Date: Signature of Employer

IQAC Co-ordinator
RISE Krishna Sai Gandhi Group
of Institutions, Valluru - 523 272

RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS::ONGOLE
(Approved by AICTE-NEW DELHI, Affiliated to JNTUK KAKINADA)
NH-16, Valluru-523272, Ongole, Prakasam (District), A.P

INTERNAL QUALITY ASSURANCE CELL (IQAC)

STUDENT FEEDBACK ON CURRICULUM

Department Name:	**Academic Year:**
Program Name:	**Year/Semester:**
Name of the Student:	**Roll Number:**

Please rate your valuable feedback on the curriculum for the review of the syllabus / to improve the quality of programme.

S.No	Question	Excellent	Very Good	Good	Average	Poor
1	How relevant do you find the course content in relation to current industry standards and practices?.					
2	How would you rate the teaching quality of the faculty in your department?.					
3	How do you rate the lab sessions and practicals effective in complementing the theoretical knowledge you gain in lectures?.					
4	How would you rate the availability and quality of learning resources (e.g., library, online materials, software)?					
5	How will you rate the timely and constructive feedback on your assignments and exams?					
6	How did you rate the approach of faculty members outside of classroom hours for doubts and discussions?.					
7	How will you rate the opportunities for students to engage in research projects or internships?					
8	Rate the curriculum and its updates to keep pace with technological advancements and industry needs?					
9	How would you rate the balance between academic studies and opportunities for extracurricular activities?.					
10	Considering all factors, how will you rate the satisfaction with the academic performance and environment of the college?					

Any other suggestions. _____

_____

Date

IQAC Co-ordinator
RISE Krishna Sai Gandhi Group
of Institutions, Valluru 523 27.

Signature of Student