

SCHEME OF STUDIES
DIPLOMA IN SOUND RECORDING AND ENGINEERING
(C-20)

V SEMESTER

CURRICULUM STRUCTURE

V Semester Scheme of Studies - Diploma in Sound Recording and Engineering [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway Title	Hours per Semester			Total contact hrs /Semester	Credits	CIE Marks		SEE-1 Marks (Theory)		SEE-2 Mark (Practical)		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min	Max	Min					
Programme Specialization Pathway																			
1	SR Specialization pathways in emerging areas Student may select any one of the specializations	20SR51I	Audio Mixing and Mastering	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20SR52I	Broadcast Engineering	104	52	312	468	24	240	96	60	24	100	40	400	160			
Science and Research Pathway				L	T	P	Total	Credits	CIE Marks		SEE Marks								
									Max	Min	Max	Min							
2	BS/SC/SR Specialization pathway in Science and Research (Student need to take all four papers in this pathway)	20SC51T	Paper 1-Applied Mathematics	52	26	0	78	6	50	20	50	20	100	40					
		20SC52T	Paper 2 - Applied Science	52	0	52	104	6	50	20	50	20	100	40					
		20RM53T	Paper 3 - Research Methodology	52	0	52	104	6	50	20	50	20	100	40					
		20TW54P	Paper 4 - Technical Writing	39	13	52	104	6	60	24	40	16	100	40					
			Total	195	39	156	390	24	210	84	190	76	400	160					
Entrepreneurship Pathway																			
3	ES/SR	20ET51I	Entrepreneurship and start up	104	52	312	468	24	240	96	160	64	400	160					

L: - Lecture T: - Tutorial P: - Practical BS- Basic Science: ES-Engineering Science: SC: Science

**Note: In 5th Semester student need to select any one of the pathways consisting of 24 credits
Students can continue their higher education irrespective of the Pathway selected**

CURRICULUM STRUCTURE

VI Semester Scheme of Studies - Diploma in Sound Recording and Engineering [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway	Course		Total contact	Credits	CIE Marks		SEE Marks		Total Marks	Marks for Passing (including CIE)	Assigned Grade	Grade Point	SGPA and CGPA
								Max	Min	Max	Min					
Internship	ES/SR	20SR61S	Specialisation pathway	Internship/project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20SR61R	Science and Research Pathway	Research project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20SR61E	Entrepreneurship and start up	Minimum Viable Product -MVP/ Incubation/ Startup proposal	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			

Note: Student shall undergo Internship/Project/research project/MVP/Incubation/Startup proposal in the same area as opted in 5th semester pathway



Government of Karnataka
DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Sound Recording and Engineering	Semester	5
Course Code	20SR51I	Type of Course	L:T:P (104: 52: 312)
Specialization	Audio Mixing and Mastering	Credits	24
CIE Marks	240	SEE Marks	160

Introduction:

Welcome to the curriculum for the Specialisation Pathway **Audio Mixing and Mastering**. This specialisation course is taught in Boot camp mode. Boot camps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning. In this course, you'll learn how to Audio Mixing and Mastering and exploit automation systems in a range of Audio Production and industrial applications that are needed for today's job market.

Leading to the successful completion of this boot camp, you shall be equipped to either do an internship in an organisation working on Sound Recording and Mixing or do a capstone project in the related field. After the completion of your Diploma, you shall be ready to take up roles like a Sound Recording Engineer, Sound Mixing Engineer, Mastering Engineer and can rise up to the level of Manager, also can become Entrepreneur in the related field and more.

This course will teach you about Recording Techniques, mixing techniques and Mastering of Audio, Building an Automation system and more. Details of the curriculum is presented in the sections below.

Pre-requisite

Before the start of this specialisation course, you will have prerequisite knowledge gained in the first two years on the following subjects:

1st year -Engineering Mathematics, Communication Skills, Computer Aided Engineering Graphics, Statistics & Analysis, Basic IT Skills, Fundamentals of Electrical and Electronics Engineering, Project Management skills, Fundamentals of Photography and Photo Sound Practical.

2nd Year-Sound Recording, Studio Recording, Architectural Acoustics, Analog and Digital Electronics, Digital Audio, Recording Techniques, Audio Video Editing, Basics of communication and Television Engineering, in this year of study, you shall be applying your previous years learning along with specialised field of study into projects and real-world applications.

Course Cohort Owner

A Course Cohort Owner is a faculty from the core discipline, who is fully responsible for one specialised field of study and the cohort of students who have chosen to study that specialised field of study.

Guidelines for Cohort Owner

1. Each Specialized field of study is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. One faculty from the Core Discipline shall be the Cohort Owner, who for teaching and learning in allied disciplines can work with faculty from other disciplines or industry experts.
3. The course shall be delivered in boot camp mode spanning over 12 weeks of study, weekly developmental assessments and culminating in a mini capstone.
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.
5. The cohort owner shall be responsible to identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for any industrial visits.
7. Cohort owner shall maintain and document industrial assignments, weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom sessions can augment or use supplementally teaching and learning opportunities including good quality online courses available on platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademy, SWAYAM, etc.

Course outcome: A student should be able to

CO1	Demonstrate Audio mixing techniques
CO2	Apply the uses of equalizer in audio mixing
CO3	Apply the techniques of compression, gating and limiting in mixing
CO4	Design Surround Sound Mixing and system
CO5	Judge the quality of sound.

Detailed course plan

Week	C O	P O	Days	1 st session (9.30am to 1.30 pm)	L	T	P	2 ND session (2pm to 5pm)	L	T	P
1	1	1	1	Introduction	2			Evolutions of Mixing Mixing Styles-LA vs New York, other vs London, other styles	1		
	1	1	2	The Mechanism of Mixing, Hearing the Final Product,	2		2	The Overall Approach, Tall, deep and wide, deep and wide	1		2
	1	1	3	The six Elements of Mix, Elements one – Balance, The Mixing Part of Mixing, The arrangements- Where it all begins Arrangements Elements	2		2	Rules of Arrangements Where to build mix from, Types of Program Material, Level setting Methods	1		2
	1	1	4	Elements two:Panorama, Placeing the Sound in Sound Field, Phantom center	2		2	Big Mono, The big Three, Panning outside the Speaker	1		2
	1		5	Weekly developmental Assessment			4	Assessment Review and corrective action			3
	1		6	Industry Class- and Industry Assignment			5				
2	2		1	Tutorial (Peer discussion on Industrial assignment)		4				1	1
	2	2	2	Elements Three: frequency Range, Equalizing ,Magic frequencies, EQ Methods,	2		2	Easy to remember Golden Rules of EQ, Tricks and tips	1		2
	2	2	3	Element Four: Dimension – Adding Effects. EQing and Reverbs	2		2	Sonic Layering of Effects,	1		2
	2	2	4	Calcultaing the delay Time	2		2	Re-amping, True tape Flanging	1		2
	2		5	Weekly developmental Assessment			4	Assessment Review and corrective action			3
	2		6	Industry Class- and Industry Assignment			5				

Week	C O	P O	Days	1 st session (9.30am to 1.30 pm)	L	T	P	2 ND session (2pm to 5pm)	L	T	P
3	2		1	Tutorial (Peer discussion on Industrial assignment)		4				1	1
	2	3	2	Elements Five:Dynamics-Compressions and	2		2	Limiting And Compression	1		2

				gating, Dynamic Contrioners Compression								
	2	3	3	The New york compression trick, Compression on Individual instruments	2	2	Compression on the mix buss Setting the compressor	1				2
	2	3	4	Element Six: Intrest – the key to great mixe, The Direction of the Song	1	3	Develop the groove and build it like a house, Find the most 6 important element and emphasize it	1				2
	2		5	CIE 1– Written and practice test		4	Assessment Review and corrective action					3
	2		6	Industry Class- and Industry Assignment		5						
4	4		1	Tutorial (Peer discussion on Industrial assignment)		4					1	1
	4	4	2	Monitoring, Basic Monitoring Setup	2	2	How Loud or soft should it be Monitors- which one, Listening Tricks and tips	1				2
	4	4	3	The master mix, Mixdowns formats	1	3	Alternative mixes, Stems	1				2
	4	4	4	Mixing in surround , A bit of histroy	2	2	Types of Sutround Sound, Bass management, Other types of surround	1				2
	4		5	Weekly developmental Assessment		4	Assessment Review and corrective action					3
			6	Industry Class- and Industry Assignment		5						
5	4		1	Tutorial (Peer discussion on Industrial assignment)		4					1	1
	4	7	2	Surround better than stereo	2	2	Surround Mixing , Surround Mixing schools of thought	1				2
	4		3	the center channel, the LFE(subwoofer) channel	2	2	Surround to stereo compoatability Surround master recorders	1				2
	4		4	Master Tape track assignments	1	3	Dolby, SMPTE and ITU Standard	1				2
	4		5	CIE 2– Written and practice test		4	Assessment Review and corrective action					3
	4		6	Industry Class- and Industry Assignment		5						
6	3		1	Tutorial (Peer discussion on Industrial assignment)		4					1	1
	3		2	Data Compression	2	2	High or Low resolution	1				2
	3		3	Dolby digital(AC-3)0r DTS Encoding	2	2	Surround Encoders	1				2

	3		4	Surround Master Media Prep	2		2	Surround Master Media Prep	1	1	2
	3		5	Weekly developmental Assessment			4	Assessment Review and corrective action			3
	3		6	Industry Class on and Industry Assignment			5				
Week	C O	P O	Days	1st session (9.30am to 1.30 pm)	L	T	P	2ND session (2pm to 5pm)	L	T	P
7			1	Tutorial (Peer discussion on Industrial assignment)			4			1	1
	1		2	Guidelines in Choosing a Mixer. The Controls - A Description.	2		2	Mono Inputs, Stereo Inputs, Subgroups,	1		2
	1		3	Master Section. Signal Flow	2		2	Input Devices. Equipment requiring Inputs and Outputs. Output Device	1		2
	1		4	, Choosing the Right Microphone Microphone types, Condenser, Dynamic, Electret.	1		3	.Different Polar Patterns.	1		2
	1		5	CIE 3– Written and practice test			4	Assessment Review and corrective action			3
	1		6	Industry Class and Industry Assignment			5				
8	1		1	Tutorial (Peer discussion on Industrial assignment)			4			1	1
	1		2	Setting up a Basic Mix	2		2	Setting the Gain, Balancing Fader Levels	1		2
	2		3	Balancing Output Levels. Using the Mixer's EQ Fixed EQ	1		3	Using a sweep-mid equaliser. Using Effects Units;	1		2
	2	7	4	The different types; Reverb, Delay, Echo, Chorus & Flanging, Pitch Shifters.	2		2	Setting up an effects loop	1		2
	2		5	Weekly developmental Assessment			4	Assessment Review and corrective			3

Week	C O	P O	Days	1 st session (9.30am to 1.30 pm)	L	T	P	2 ND session (2pm to 5pm)	L	T	P
			6	Industry Class and Industry Assignment			5	action			
9	5	6	1	Tutorial (Peer discussion on Industrial assignment)		4				1	1
	5	6	2	Pre and post fade auxiliaries. Using Signal Processors	2		2	The difference between signal processors and effects	1		2
	5	6	3	Different types of signal processors; Graphic Equalisers, Parametric Equalisers,	2		2	Gates, Expanders, Compressors/Limiters.	1		2
	5	6	4	Setting up a processor.	1		3	Creating a Fold back/Monitor Mix	1		2
	5		5	CIE 4– Written and practice test			4	Assessment Review and corrective action			3
	5		6	Industry Class and Industry Assignment			5				
10	1		1	Tutorial (Peer discussion on Industrial assignment)		4					3
	1	5	2	PA MIXING:Introduction, A Typical Live Performance;	2		2	Microphones, Cables and Connections, Connecting External Effects and Processors,	1		2
	1	5	3	Setting Up, Ringing Out: Nulling Room Acoustics,	2		2	Setting the Mix, Avoiding Feedback.	1		2
	1	5	4	Larger Performances; Medium Venues,	1		3	Large Sized Venues Recording Live.	1		2
	1		5	Weekly developmental Assessment			4	Assessment Review and corrective action			3
			6	Industry Class- and Industry Assignment			5				
Week	C O	P O	Days	1st session (9.30am to 1.30 pm)	L	T	P	2ND session (2pm to 5pm)	L	T	P
11			1	Tutorial (Peer discussion on Industrial assignment)		4					3
	1	5	2	Automation Writing Automation Updating Automation ,Latch Mode Touch Mode	2		2	The Five Automation Modes	1		2
	1	5	3	Drawing Automation	2		2	The Line Pencil Tool	1		2

				Selective Delay			Other Pencil Shapes			
	2	4	4	The Trim Tool Editing Automation	2	2	Paste Special and Copy Special Not Fade Away	1		2
	2		5	CIE 5– Written and practice test		4	Assessment Review and corrective action			3
	2		6	Industry Class and Industry Assignment		5				
12		3	1	Tutorial (Peer discussion on Industrial assignment)		4				3
	2	3	2	Bouncing Your Mix Bounce to Disk The Bounce Procedure	2	2	Bounce Parameters Bouncing to an MP3	1		2
	2	3	3	The Real-Time Bounce Dither A Brief Bounce Experiment	2	2	Bouncing Synthesizer Parts Bouncing MIDI “Live Printing MIDI Parts The Other Bounce	1		2
	3	3	4	Mix Data sheets	2	2	Mastering data sheets	1		2
	3	3	5	Weekly developmental Assessment		4	Assessment Review and corrective action			3
	3		6	Industry Class and Industry Assignment		5				
13			1	Internship a) Secondary research on various industries and their operations to identify at least 3 companies along with the areas of work interest and develop an internship plan that clearly highlights expectations from the industry during the internship. b) Design and develop a cover letter for an internship request to all 3 identified companies and the resume to be submitted to potential companies.			Project a) Identification of the problem statement (from at least 3 known problems) the students would like to work as part of the project – either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective. b) Design and develop the project solution or methodology to be used to solve at least one of the problems identified.			

				<p>c) Prepare for an internship interview to highlight your interests, areas of study, career aspirations and personnel competence – including the areas of learning you expect to learn during internship.</p>	<p>c) Prepare a project plan that will include a schedule, WBS, Budget and known risks along with strategies to mitigate them to ensure the project achieves the desired outcome.</p>
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References

1. The Mixing Engineer’s Handbook-Bobby Owsinski
2. Basics of Mixing a Beginner’s: Roland Guide to the Art of Mixing
3. Digital Recording, Mixing And Mastering Volume 1- Sean Vincent and Alan Branch

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE (1 to 5)

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Sound Recording and Engineering	Semester	V
Course	Audio Mixing and Mastering	Max Marks	30
Course Code	20SR51I	Duration	4 hours
Name of the course coordinator			

Note: Answer one full question from each section.

Sl. No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) – 10 marks					
1.a)	Explain The six Elements of Mix		1	1	5
b)	Discuss Evolutions of Mixing		2	2	5
2.a)	Develop the groove and build it like a house		3	3	5
b)	Find the most 6 important element and emphasize it		2	4	5
c)	Calculating the delay Time		2	4	5
Section-2 (Practical) - 20 marks					
3)	Practice the mixing of multi track		1		10
4)	Practice the adding the various types effects of Program material		2		10

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Sound Recording and Engineering		Semester: V		
Course : Audio Mixing and Mastering		Max Mark : 100 Marks		
Course Code : 20SR51I		Duration: 3 Hrs		
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL (L3/L4)	CO	Marks
Section-1				
1.a)	Discuss The Overall Approach, Tall, deep and wide, deep and wide		1	5
b)	List The six Elements of Mix			5
2.a)	Explain Rules of Arrangements Where to build mix from			5
b)	Explain the application of Equalizing in mixing			5
Section-2				
3.a)	Calculating the delay Time		2	5
b)	Discuss Re-amping, and True tape Flanging			5
4.a)	Explain use of Dynamics-Compressions and gating,			5
b)	Develop the groove and build it like a house,			5
Section- 3				
5.a)	Find the most 6 important element and emphasize it		3	5

b)	Discuss the Limiting And Compression			5
6.a)	Discuss Basic Monitoring Setup			
b)	List the Mixdowns formats			5
Section-4				
7.a)	List the Types of Sutrround Sound		4	5
b)	Explain Dolby digital(AC-3)0r DTS Encoding			5
8.a)	Demonstrate Pre and post fade auxiliaries.			5
b)	Compare signal processors and effects			5
Section-5				
9.a)	Explain A Typical Live Performance;		5	5
b)	Differentiate Latch Mode and Touch Mode			5
10.a)	Explain The Bounce Procedure			5
b)	Write the Mastering data sheets			5

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Case submission	20
2	Case presentation	20
3	Case innovation	20
4	Result	20
5	Viva voce	20
Total		100

Case Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings and beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3
Total						14/20

Case Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding of the issues in the problem statement.	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5

Involvement of the class / Examiners <ul style="list-style-type: none"> • Questions • Discussions • Activities 	<p>Excellent and salient discussion points that elucidated material to develop a deep understanding</p> <p>Appropriate and imaginative activities used to extend understanding in a creative manner</p>	<p>Questions and discussions addressed important information that developed understanding</p> <p>Appropriate activities used to clarify understanding</p>	<p>Questions and discussions addressed important superficial issues of the problem statement Limited use of activities to clarify understanding</p>	<p>Little or no attempt to engage the class / examiner in demonstrating their learning</p>	<p>Did not engage the class / examiner and poor listening skills</p>	<p>1</p>
Total						12/20

Case Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	<p>The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc.</p> <p>The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning.</p>	<p>The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class.</p> <p>Outcome achieved as per the problem brief</p>	<p>The topic was researched but information and data were only partly from reliable sources of information.</p> <p>The proof was not fully backed up with good data or reasoning as taught in the class.</p> <p>Partial outcome achieved as per the problem brief</p>	<p>The topic was researched and data were not from reliable sources.</p> <p>The proof was not backed up with data, analysis or reasoning as taught in the class.</p> <p>Some outcome obtained as per the problem brief</p>	<p>Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief</p>	4

	Outcome achieved beyond the problem brief					
Application of class learning in problem solving	Made effective use of class principles, models and theories. Also used creativity to find effective results appropriate to industry beyond class learning.	Made good use of class principles, models and theories Some creative ideas were explored to find desired outcome but within the framework of class learning	Made some use of class principles, models and theories No creative ideas or models explored	Made limited use of class principles, models and theories	Poorly applied class principals, models and theories	3
Response to Class / Examiners Queries	Queries Excellent response to comments and discussion with appropriate content supported by theory/research	Good response to questions and discussions with some connection made to theory/research	Satisfactory response to questions and discussions with limited reference to theory/research	Limited response to questions and discussions with no reference to theory/research	Poor or no response to questions and did not participate in the discussions.	2
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Case Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models / approaches and how they can be applied to solve the problem on hand	Various ideas and innovative solutions have been proposed and their application have been clearly outlined	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply them	Some ideas or innovative solutions have been proposed but the process of applying them hasn't been specified	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have been identified.	3
Total						13/20



Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Program	Sound Recording &Engineering	Semester	5
Course Code	20SR52I	Type of Course L:T:P	104:52:312
Specialization	Broadcast Engineering	Credits	24
CIE Marks	240	SEE Marks	160

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1. Each Specialized field of study is restricted to a Cohort of 20 students which could include students from other relevant programs.
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6. Cohort owner shall maintain and document industrial assignments, weekly assessments, practices and mini project.
7. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
8. The cohort owner along with classroom sessions can augment or use supplementally teaching and learning opportunities including good qualityonline courses available on platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademy, SWAYAM , etc.
9. Cohort owner shall guide the cohorts for the selection and execution of mini project.

Course outcome: A student should be able to

CO1	Identify the segments in Broadcasting
CO2	Familiarize with Radio and Television Broadcast Systems
CO3	Understand the working of Radio and TV Antennas
CO4	Analyze the operation of Outside Broadcasting
CO5	Understand the concepts of Satellite navigation and GPS

Detailed course plan

Week	C O	P O	Days	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
	Learning outcomes										
1			1	Introduction to Broadcasting	2	-	2	Segmentation in Broadcasting: Radio Broadcasting – Public radio, Community radio	1	-	2
			2	College radio, Commercial radio	1		3	Internet radio, podcasting	1		2
			3	Television broadcasting- Terrestrial television	1		3	Closed-circuit television	1		2
			4	Outside broadcasting	1		3	Direct Broadcast satellite (DBS)	1		2
			5	Developmental Assessment			4	Assessment Review and corrective action			3
			6.	Industry class	2		2	Weekly Assignment		1	
	Learning outcomes										
2			1	Peer Review		4		The Electromagnetic Spectrum- Introduction, Spectral Sub-Regions	1		2
			2	Propagation- Introduction, Propagation in Free Space, Propagation Over Plane Earth	1		3	Frequency Sources and References- Introduction, Characteristics of Crystal Devices, Oscillators	1		2
			3	Phase-Locked Loop Synthesizers, Multi-loop synthesizers, Direct Digital Synthesis	1		3	Modulation Systems and Characteristics- Introduction, Amplitude Modulation	1		2
			4	Frequency Modulation, Phase Modulation, ASK, FSK	1		3	PSK, MSK, GMSK, Spread Spectrum Systems	1		2
			5	Developmental Assessment			4	Assessment Review and corrective action			3
			6	Industry Class	2		2	Weekly Assignment		1	

Learning outcomes											
3			1	Peer review		4		Radio Broadcast Systems-Introduction, Standard Broadcasting	1		2
			2	FM Broadcasting, Transmitter Performance and Maintenance	1		3	Radio STL Systems-Introduction, STL System Configuration, System Planning	1		2
			3	Digital Radio Systems-Introduction	1		3	Technical Considerations	1		2
			4	Digital Audio Broadcasting	1		3	In-Band Digital Radio	1		2
			5	CIE 1 – Written and Practice Test			4	Assessment Review and corrective action			3
			6	Industry Class	2		2	Weekly Assignment		1	
Learning outcomes											
4			1	Peer Review		4		Television Transmission Standards-Introduction	1		2
			2	PAL, NTSC System	1		3	DTV System-Introduction, DTV System Overview	1		2
			3	DTV Transmission Characteristics	1		3	Television Transmitters – Introduction, DTV Transmitter Considerations	1		2
			4	Technology Options	1		3	Implementation Issues	1		2
			5	Developmental Assessment			4	Assessment Review and corrective action			3
	2	1,2	6	Industry Class	2		2	Weekly Assignment		1	
Learning outcomes											
5			1	Peer Review		4		Multiple Transmitter Networks – Introduction, Single Frequency Network	1		2

							Concepts			
		2	Distributed Transmission Architecture	1		3	Multiple Frequency Network Concepts	1		2
		3	Transmission Line- Introduction, Electrical Parameters	1		3	Waveguides	1		2
		4	RF Combiner and Diplexer Systems – Introduction, Passive Filters	1		3	Four-Port Hybrid Combiner, High-Power Isolators	1		2
		5	CIE 2 – Written and Practice Test			4	Assessment Review and corrective action			3
		6	Industry Class	2		2	Weekly Assignment		1	
	Learning outcomes									
6		1	Peer Review			4	Radio Antenna Principles- Introduction, Fundamental Parameters	1		2
		2	Impedance Matching	1		3	Antenna Types	1		2
		3	AM Broadcast Antenna Systems	1		3	FM Broadcast Antenna Systems	1		2
		4	Television Antenna Principles – Introduction, Polarization, Gain	1		3	Voltage Standing-Wave Ratio and Impedance, Azimuthal-Pattern Distortion in Multiple-Antenna Installations	1		2
		5	Developmental Assessment			4	Assessment Review and corrective action			3
		6	Industry Class	2		2	Weekly Assignment		1	
	Learning outcomes									
		1	Peer Review			4	Television Transmitting Antennas – Introduction, Common Antenna Designs	1		2
		2	DTV Implementation Issues	1		3	Key Considerations in System Design	1		2

7		3	Antenna Towers – Introduction, Antenna Tower Lighting and Marking Requirements	1	3	Tower Grounding – Introduction, Terms and Codes, The Grounding Electrode	1	2
		4	Establishing an Earth Ground, Bonding Ground-System Elements, Grounding Tower Elements	1	3	Grounding on Bare Rock, Transmission-System Grounding, Satellite Antenna Grounding	1	2
		5	CIE 3 – Written and Practice Test		4	Assessment Review and corrective action		3
		6	Industry Class	2	2	Weekly Assignment	1	
Learning outcomes								
8		1	Peer Review		4	Lightning Effects – Introduction, Sources of Atmospheric Energy	1	2
		2	Characteristics of Lightning, Electrostatic Discharge	1	3	EMP Radiation, Coupling Transient Energy	1	2
		3	Receiver Characteristics – Introduction, The Receiving System, Selectivity	1	3	Dynamic Range, Gain Control, Digital Receiver Characteristics	1	2
		4	AM and FM Receivers – Introduction, Radio Wave Propagation	1	3	Radio Receivers, Stereo Systems	1	2
		5	Developmental Assessment		4	Assessment Review and corrective action		3
		6	Industry Class		2	Weekly Assignment	1	
Learning outcomes								
9		1	Peer Review		4	Television Reception Principles – Introduction, Basic Operating Principles	1	2
		2	DTV Receiver Systems – Introduction, Receiver System Overview	1	3	Receiver Equalization Issues	1	2

		3	Digital Test Instruments- Introduction, Digital Multimeters, Conventional Test Instruments	1	3	Logic Analyzer, Spectrum Analyzer, Automated Test Instruments	1	2
		4	OB Van: Introduction	1	3	Interior of OB Van- Production control crew and equipments	1	2
		5	CIE 4 – Written and Practice Test		4	Assessment Review and corrective action		3
		6	Industry Class	2	2	Weekly Assignment	1	
Learning outcomes								
10		1	Peer Review		4	Sound crew and equipments, VTR crew and equipments	1	2
		2	Engineering crew and equipments	1	3	Supported vehicles	1	2
		3	Transmission of Video- Direct microwave link, Communication satellites, Fiber Optic link, Cellular network.	1	3	Satellite Communication: Satellite - Types, orbits. Apogee and perigee, azimuth and elevation angles	1	2
		4	sub satellite point, subsatellite paths, ascending and descending nodes	1	3	Posigrade and Retrograde orbits, Uplink and downlink	1	2
		5	Developmental Assessment		4	Assessment Review and corrective action		3
		6	Industry Class	2	2	Weekly Assignment	1	
Learning outcomes								
11		1	Peer Review		4	Orbital period and radius of geosynchronous satellite, satellite eclipse.	1	2
		2	Polar and Geostationary satellites - advantages and	1	3	LEO, MEO & GEO satellites, Station keeping	1	2

			disadvantages							
		3	Attitude control and thermal control	1		3	Satellite communication system- block diagram	1	2	
		4	Transponder- single conversion, double Conversion, Regenerative transponder	1		3	Increasing channel capacity- frequency reuse and spatial isolation	1	2	
		5	CIE 5– Written and Practice Test			4	Assessment Review and corrective action		3	
		6	Industry Class	2		2	Weekly Assignment		1	
	Learning outcomes									
12		1	Peer Review			4	Communication satellite- satellite subsystems.	1	2	
		2	Earth station- block diagram	1		3	Applications payload.	1	2	
		3	Global Positioning System (GPS)–features, working	1		3	Satellite for TV applications -Direct-To-Home (DTH) and cable TV	1	2	
		4	Satellite for military applications	1		3	VSAT- features and applications	1	2	
		5	Developmental Assessment			4	Assessment Review and corrective action		3	
		6	Industry Class	2		2	Weekly Assignment		1	
	Learning outcomes									
13		1	<p>Internship</p> <p>a) Secondary research on various industries and their operations to identify at least 3 companies along with the areas of work interest and develop an internship plan that clearly highlights expectations from the industry during the internship.</p> <p>b) Design and develop a cover letter for an internship request to all 3 identified companies and the resume to</p>	<p>Project</p> <p>a) Identification of the problem statement (from at least 3 known problems) the students would like to work as part of the project – either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective.</p> <p>b) Design and develop the project solution or</p>						

			<p>be submitted to potential companies. Prepare for an internship interview to highlight your interests, areas of study, career aspirations and personnel competence – including the areas of learning you expect to learn during internship</p>	<p>methodology to be used to solve at least one of the problems identified. Prepare a project plan that will include a schedule, WBS, Budget and known risks along with strategies to mitigate them to ensure the project achieves the desired outcome.</p>
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CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 – Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

*The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE (1 to 5)

Note : Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Sound Recording & Engineering	Semester	V
Course	Broadcast Engineering	Max Marks	30
Course Code	20SR52I	Duration	4 hours
Name of the course coordinator			

Note: Answer one full question from each section.

Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) – 10 marks					
1.a)					6
b)					4
2.a)					5
b)					5
Section-2 (Practical) - 20 marks					
3)					
4)					

Note : Theory questions shall be aligned to practical questions

Scheme of Evaluation for CIE 6

Sl No	Description	Marks
1	Project report	20
2	Project presentation	20
3	Viva voce	20
Total		60

Instructions to students:

Students will have the opportunity to update their final report submission for SEE 2 post CIE 6 in order to enable them to address the feedback received during their CIE 6 assessment and also work towards achieving the desired project/case outcome.

Assessment framework for SEE 1 (Theory)

Programme : Sound Recording & Engineering		Semester : V		
Course : Broadcast Engineering		Max Marks : 100		
Course Code :20SR52I		Duration : 3 Hrs		
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Explain community radio broadcasting		1	5
b)	List the features of college radio			5
2.a)	Discuss about terrestrial TV system			5
b)	Explain DBS			
Section-2				
3.a)	Describe the electromagnetic spectrum		2	5
b)	Explain ASK			5
4.a)	Explain FM broadcasting			5
b)	Explain DTV			5
Section- 3				
5.	Discuss about AM broadcast antenna system		3	10
6.	Explain Television antenna principles			10
Section-4				
7.	Explain the production control crew and equipments in OB van		4	10
8.	Explain sound crew and equipments in OB van			10
Section-5				
9.a)	List the advantages of Geostationary orbit satellites		5	5
b)	Explain station keeping			5
10.a)	Explain the block diagram of satellite communication system			5
b)	Explain the working of GPS			5

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Case submission	20
2	Case presentation	20
3	Case innovation	20
4	Result	20
5	Viva voce	20
Total		100

Case Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings and beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3
Total						14/20

Case Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5

	of the issues in the problem statement.					
Involvementoftheclass/Examiners Questions Discussions Activities	Excellent and salient discussion points that elucidated material to develop a deep understanding Appropriate and imaginative activities used to extend understanding in a creative manner	Questions and discussions addressed important information that developed understanding Appropriate activities used to clarify understanding	Questions and discussions addressed important superficial issues of the problem statement Limited use of activities to clarify understanding	Little or no attempt to engage the class / examiner in demonstrating their learning	Did not engage the class / examiner and poor listening skills	1
Total						12

Case Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	<p>The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc.</p> <p>The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning.</p> <p>Outcome achieved beyond the problem brief</p>	<p>The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class.</p> <p>Outcome achieved as per the problem brief</p>	<p>The topic was researched but information and data were only partly from reliable sources of information.</p> <p>The proof was not fully backed up with good data or reasoning as taught in the class.</p> <p>Partial outcome achieved as per the problem brief</p>	<p>The topic was researched and data were not from reliable sources.</p> <p>The proof was not backed up with data, analysis or reasoning as taught in the class.</p> <p>Some outcome obtained as per the problem brief</p>	<p>Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief</p>	4
Application of class learning in problem solving	<p>Made effective use of class principles, models and theories.</p> <p>Also used creativity to find effective results appropriate to industry beyond class learning.</p>	<p>Made good use of class principles, models and theories Some creative ideas were explored to find desired outcome but within the framework of class learning</p>	<p>Made some use of class principles, models and theories No creative ideas or models explored</p>	<p>Made limited use of class principles, models and theories</p>	<p>Poorly applied class principals, models and theories</p>	3

Response to Class / Examiners Queries	Queries Excellent response to comments and discussion with appropriate content supported by theory/research	Good response to questions and discussions with some connection made to theory/research	Satisfactory response to questions and discussions with limited reference to theory/research	Limited response to questions and discussions with no reference to theory/research	Poor or no response to questions and did not participate in the discussions.	2
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Case Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models /	Various ideas and innovative solutions have been proposed and their application have been clearly	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply	Some ideas or innovative solutions have been proposed but the process of applying them hasn't	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3

approaches and how they can be applied to solve the problem on hand	outlined	them	been specified			
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have been identified.	3
Total						13/20

References

Sl. No	Description
1	Broadcast Engineer's reference book - E.P.J. Tozer, Focal Press publication
2	Digital Audio Broadcasting – Wolfgang Hoeg and Thomas Lauterbach, Wiley Publication
3	Digital Video and Audio Broadcasting Technology – W. Fischer, Springer Publication

Required Course Facilities:

- 1. Lab equipments list with appropriate specifications (Batch size:20)**
- 2. Related Industry connect to conduct industry classes**
- 3. Appropriate Virtual practice links**