

UNLV

UNIVERSITY OF NEVADA, LAS VEGAS

Program Review Self-Study

Program Reviewed: Entertainment Engineering and Design

Degrees: B.S. Entertainment Engineering and Design,
B.S. Entertainment Technology and Design

Program Chair or Director: Michael Genova

Dean: Dr. Rama Venkat and Dr. Nancy Uscher

Date of Report: 1/15/2019

GENERAL INSTRUCTIONS

1. **Please complete the program review self-study using this template.**
2. If this review is covering several degree levels, please be sure to address *each level* in your responses to the questions.
 - Dr. Rainier Spencer, Vice Provost for Academic Affairs: rainier.spencer@unlv.edu, 702-895-5833.
 - Nora Carroll, Academic Programs Analyst, eleonora.carroll@unlv.edu, 702-895-1888.
3. **Self-study submission:**
 - Send completed self-study electronically to rainier.spencer@unlv.edu and eleonora.carroll@unlv.edu.

I. Program Description

A. College/Department/Program

1. College or School: College of Fine Arts and The Howard Hugh's College of Engineering
2. Unit: Web Address: <https://www.unlv.edu/eed>
3. Program being reviewed: B.S. Entertainment Engineering and Design, B.S. Entertainment Technology and Design
 - a) Degrees and their abbreviations: BS EED, BD ETD

B. Primary individual completing this worksheet

1. Name: Michael Genova
2. Title: Coordinator Entertainment Engineering and Design, Assistant Professor of the Practice
3. Date of self-study: 1/15/2019
4. Campus phone number: (702)895-0448
5. Mail stop: 5013
6. E-mail: michael.genova@unlv.edu
7. Fax number: (702)895-3664

C. Other faculty involved in writing this report:

Dr. Yingtao Jiang
Dr. Si Jung Kim
Mrs. Helga Watkins

D. Catalog Description

Entertainment Engineering and Design Major - Bachelor of Science (BS)

Please see the UNLV Entertainment Engineering and Design department web page at www.eed.egr.unlv.edu/ for more information about department programs, faculty, and facilities.

Program Objectives - The educational objectives of the Bachelor of Science in Entertainment Engineering and Design: Engineering Option is to educate students so that they can work in the entertainment engineering field as it applies to the design, manufacture, and control of structures, machines, processes, and systems used in the entertainment industry.

Program Goals - To achieve these objectives, the Entertainment Engineering and Design program's goals are for the graduate to possess:

1. Appropriate technical knowledge and skills
2. Appropriate fine art knowledge and skills
3. Appropriate interpersonal skills
4. The knowledge and skills to be a responsible citizen

Program Outcomes - To achieve these objectives and goals, each graduate of the Entertainment Engineering Technology and Design program will attain the following outcomes before graduation:

1. Appropriate technical knowledge and skills
 - 1.1. An ability to apply mathematics through differential and integral calculus
 - 1.2. An ability to apply advanced mathematics such as differential equations, linear algebra, complex variables, & discrete mathematics
 - 1.3. An ability to apply knowledge of basic sciences
 - 1.4. An ability to apply knowledge of computer science
 - 1.5. An ability to apply knowledge of probability and statistics
 - 1.6. An ability to apply knowledge of engineering
 - 1.7. An ability to design a system, component, or process to meet desired needs within realistic constraints
 - 1.8. An ability to identify, formulate, and solve engineering problems
 - 1.9. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
 - 1.10. An ability to design and conduct experiments, as well as to analyze and interpret data
2. Appropriate fine art knowledge and skills knowledge and comprehension of entertainment design principles and concepts
 - 2.1. An ability to use technology to communicate through art
 - 2.2. An ability to express visual concepts and ideas in a creative manner at a professional level
 - 2.3. An ability to demonstrate appropriate technical knowledge and skills of various artistic mediums
3. Appropriate interpersonal skills
 - 3.1. An ability to function on multidisciplinary teams
 - 3.2. An ability to communicate effectively
4. The knowledge and skills to be a responsible citizen
 - 4.1. An understanding of professional and ethical responsibility
 - 4.2. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, & societal context
 - 4.3. A recognition of the need for, and an ability to engage in life-long learning
 - 4.4. A knowledge of contemporary issues

Entertainment Engineering and Design Degree Requirements - Total: 129-137 Credits
(see notes 1-3 below)

General Education Requirements - Subtotal: 30-36 Credits

First-Year Seminar - Credits: 2-3
English Composition - Credits: 6
ENG 101 - Composition I
ENG 102 - Composition II
Second-Year Seminar - Credits: 3
PHIL 242 - Ethics For Engineers and Scientists

Constitutions - Credits: 4-6
HIST 100 - Historical Issues and Contemporary Society

or PSC 101 - Introduction to American Politics

Or a combination of one course from each of the following two lists:

US Constitution: HIST 101 - United States: Colonial Period to 1877

Nevada Constitution: HIST 102 - United States Since 1877, HIST 217 - Nevada History, PSC 100 - Nevada Constitution

Mathematics - Credits: 4

MATH 181 - Calculus I

Distribution Requirement - Credits: 18

Please see Distribution Requirements for more information.

Humanities and Fine Arts: 9 credits

PHIL 242 - Ethics For Engineers and Scientists (see note 5)

COM 101 or COM 216

ART 101 - Drawing I

Social Science: 9 credits

ECON 190 - Global Economics (see note 4)

CEE 307 - Engineering Economics

One social science elective course chosen to satisfy the Multicultural Requirement

Life and Physical Sciences and Analytical Thinking:

Automatically satisfied by Major requirement

Multicultural and International

Multicultural, one 3 credit course required

International, one 3 credit course required

These courses may overlap with general education and major requirements. A single course may not meet the multicultural and international requirements simultaneously. For the list of approved multicultural and international courses, go to: <http://faculty senate.unlv.edu/students> (see note 4)

Major Requirements - BS in Entertainment Engineering and Design Major - Engineering Option - Subtotal: 99-101 Credits

Required Mathematics, and Natural Science Courses - Credits: 17

Specific Courses Required:

Required Mathematics Courses - Total Credits: 17

MATH 182 - Calculus II

MATH 283 - Calculus III

Program Review Self-Study
Academic Year 2018–19

MATH 431 - Mathematics for Engineers and Scientists I
MATH 432 - Mathematics for Engineers and Scientists II
STAT 463 - Applied Statistics for Engineers

Required Natural Science Courses - Total Credits: 8

PHYS 180 - Physics for Scientists and Engineers I
PHYS 180L - Physics for Scientists and Engineers Lab I
PHYS 181 - Physics for Scientists and Engineers II
PHYS 181L - Physics for Scientists and Engineers Lab II

Required Mathematics/Science Elective Courses - Total Credits: 3

Choose one course from the approved list of math/science courses.

Required Seminars Courses - Credits: 4

EED 100 - Entertainment Engineering and Design Seminar I
EED 200 - Entertainment Engineering and Design Seminar II
EED 300 - Entertainment Engineering and Design Seminar III
EED 400 - Entertainment Engineering and Design Seminar IV

Required Entertainment Design Fundamental Courses - subtotal Credits: 48

Required Civil Engineering Courses - Credits: 14

CEE 241 - Statics
CEE 367 - Fluid Mechanics
CEE 367L - Fluid Mechanics Laboratory
CEE 370 - Engineering Mechanics of Deformable Bodies
CEE 370L - Engineering Mechanics of Deformable Bodies Laboratory
CEE 381 - Structural Analysis I

Required Computer Science Courses - Credits: 3

CS 140 - Computing Languages

Required Computer Engineering Courses - Credits: 3

CpE 100 - Digital Logic Design I

Required Electrical Engineering Courses - Credits: 3

EE 292 - Fundamentals of Electrical & Computer Engineering

Required Mechanical Engineering Courses - Credits: 7

ME 242 - Dynamics
ME 319 - Introduction to Programming for Mechanical Engineers
ME 330 - Analysis of Dynamic Systems

Required Entertainment Design Courses - Credits: 15

EED 110 - Material Science and Fabrication Techniques
EED 111 - Basic Kinetic Structures
EED 210 - Multi-Media Design

Program Review Self-Study
Academic Year 2018–19

EED 220 - Design for Live Entertainment
EED 250 - History of Entertainment and Technology

Required Capstone - Credits: 3

EED 497 - Senior Design I
EED 498 - Senior Design II

Engineering Tracks - Credits: 12

Each students must complete two of the tracks listed below:

Structural Engineering - Credits: 6

CEE 346 - Civil Engineering Materials
CEE 432 - Geological Engineering
CEE 444 - Steel Structural Design

Acoustics - Credits: 6

ME 434 - Noise Control
MUS 231 - Recording Technology I
EED 217 - Entertainment Sound I

Robotics - Credits: 6

ME 421 - Automatic Controls
ME 421L - Automatic Controls Laboratory
ME 425 - Robotics

Systems & Live Entertainment - Credits: 6

EED 330 - Programmable Systems for the Entertainment Industry
EED 431 - Control Systems for the Entertainment Industry
EED 442 - Animatronics Techniques

Required Fine Arts Electives - Total Credits: 3

Choose one fine art elective course from the approved list.

AAD 180 - Design Foundation I
ART 107 - Design Fundamentals I
ART 156 - Design Fundamentals III
ART 216 - Sculpture I
ART 243 - Digital Imaging I
ART 419 - Foundry Sculpture
EED 310 - Product Design I
EED 320 - Rigging and Structural Design Principles
EED 330 - Programmable Systems for the Entertainment Industry **
EED 418 - Entertainment Sound IV
EED 432 - Rigging Systems for the Entertainment Industry
EED 441 - Motion Capture
EED 451 - Entertainment Venue Design
MUS 231 - Recording Technology I
THTR 404 - Theatre Technology II

Courses marked with ** cannot be used towards both the engineering track areas and the required fine art elective.

Notes

1. Regardless of catalog of graduation, students must satisfy prerequisite and corequisite course requirements as specified in the current Undergraduate Catalog.
2. All prerequisite courses must be completed with a grade of C or better before the subsequent course can be taken.
3. All courses counted towards the degree must be completed with a grade of C or better. ECON 190 satisfies the International requirement. The one free 3-credit social science elective should be selected to satisfy the Multicultural requirement.
4. PHIL 242 will simultaneously satisfy both a humanities requirement and the Second Year Seminar requirement for students obtaining a degree from the College of Engineering that requires more than 120 credits.

Entertainment Technology and Design Major - Bachelor of Science (BS)

Unlike engineers who creatively apply physical theory and advanced mathematics to design, manufacture, and control structures, machines, processes, and systems, engineering technologists apply creative practical and hands-on approaches to implement designs for specific applications. Entertainment engineering technology is an engineering technology that creates the highly technical designs that the entertainment industry has come to demand. Entertainment engineering involves the application of traditional engineering technology disciplines including computer, electrical, mechanical and civil engineering technology to the art of entertainment. The Bachelor of Science in Entertainment Technology and Design provides a path for students who are interested in pursuing the interdisciplinary fusion of engineering and the fine arts that will allow them to succeed in the entertainment industry.

Please see the UNLV Entertainment Technology and Design department web page at www.eed.egr.unlv.edu for more information about department programs, faculty, and facilities.

Program Objectives

The educational objectives of the Bachelor of Science in Entertainment Technology and Design is to educate students so that they can work in the design, production, installation, and operation of entertainment devices, systems, and venues.

Program Goals

To achieve these objectives, the Entertainment Technology and Design program's goals are for the graduate to possess:

- Appropriate technical knowledge and skills
- Appropriate fine art knowledge and skills
- Appropriate interpersonal skills
- The knowledge and skills to be a responsible citizen

Program Outcomes

To achieve these objectives and goals, each graduate of the Entertainment Engineering Technology and Design program will attain the following outcomes before graduation:

1. Appropriate technical knowledge and skills
 - 1.1. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
 - 1.2. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
 - 1.3. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
 - 1.4. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
 - 1.5. an ability to identify, analyze, and solve broadly-defined engineering technology problems
 2. Appropriate fine art knowledge and skills
 - 2.1. knowledge and comprehension of entertainment design principles and concepts
 - 2.2. an ability to use technology to communicate through art
 - 2.3. an ability to express visual concepts and ideas in a creative manner at a professional level
 - 2.4. an ability to demonstrate appropriate technical knowledge and skills of various artistic mediums
 3. Appropriate interpersonal skills
 - 3.1. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature
 - 3.2. an ability to function effectively as a member or leader on a technical team
 4. The knowledge and skills to be a responsible citizen
 - 4.1. an understanding of the need for and an ability to engage in self-directed continuing professional development
 - 4.2. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
 - 4.3. a knowledge of the impact of engineering technology solutions in a societal and global context
 - 4.4. a commitment to quality, timeliness, and continuous improvement
- Entertainment Technology and Design Degree Requirements - Total: 127-133 Credits**
(see notes 1-3 below)

Program Review Self-Study
Academic Year 2018–19

General Education Requirement - Subtotal: 30-36 Credits

First-Year Seminar - Credits: 2-3
English Composition - Credits: 6
ENG 101 - Composition I
ENG 102 - Composition II
Second-Year Seminar - Credits: 3
PHIL 242 - Ethics For Engineers and Scientists (See note 5 below)

Constitutions - Credits: 4-6

HIST 100 - Historical Issues and Contemporary Society
or PSC 101 - Introduction to American Politics

Or a combination of one course from each of the following two lists:

US Constitution: HIST 101 - United States: Colonial Period to 1877

Nevada Constitution: HIST 102 - United States Since 1877, HIST 217 - Nevada History, or PSC 100 - Nevada Constitution

Mathematics - Credits:4

MATH 181 - Calculus I

Distribution Requirement -Credits: 18

Please see Distribution Requirements for more information.

Humanities and Fine Arts: 9 credits

PHIL 242 - Ethics For Engineers and Scientists
COM 101 - Oral Communication or COM 216 Survey of Communication Studies
ART 101 - Drawing I

Social Science: 9 credits

ECON 190 - Global Economics
CEE 307 - Engineering Economics
One social science elective course chosen to satisfy the Multicultural Requirement
(see note 4 below)

Life and Physical Sciences and Analytical Thinking:

Automatically satisfied by Major requirement

Multicultural and International

Multicultural, one 3 credit course required
International, one 3 credit course required

These courses may overlap with general education and major requirements. A single course may not meet the multicultural and international requirements simultaneously. For the list of approved multicultural and international courses, go to: <http://faculty senate.unlv.edu/students>
(see note 4)

Major Requirements - BS in Entertainment Technology and Design Subtotal: 98-103 Credits
Specific Courses Required:

Required Mathematics - Credits: 7

MATH 182 - Calculus II

STAT 152 - Introduction to Statistics

Required Natural Science Courses - Credits: 8

PHYS 151 - General Physics I
PHYS 151L - General Physics I
PHYS 152 - General Physics II
PHYS 152L - General Physics II

Required Seminars - Credits: 8

EED 100 - Entertainment Engineering and Design Seminar I
EED 200 - Entertainment Engineering and Design Seminar II
EED 300 - Entertainment Engineering and Design Seminar III
EED 400 - Entertainment Engineering and Design Seminar IV

Required Entertainment Design Fundamental Courses - Total Credits: 30

Required Entertainment Design Courses - Credits: 15

EED 110 - Material Science and Fabrication Techniques
EED 111 - Basic Kinetic Structures
EED 210 - Multi-Media Design
EED 220 - Design for Live Entertainment
EED 250 - History of Entertainment and Technology

Required Technical Theatre Courses - Credits: 9

THTR 200 - Introduction to Design/Technology
THTR 204 - Theatre Technology I
THTR 406 - CAD for the Theatre

Required Internship & Capstone - Credits: 6

EED 493 - Internship in EED
EED 497 - Senior Design I
EED 498 - Senior Design II

Technology Science Fundamentals - Total Credits: 16

Construction Technology - Credits: 10

CEM 250 - Construction Materials and Methods
CEM 270 - Construction Engineering Mechanics
CEE 409 - Engineering Project Management

Computer Technology - Credits: 6

CS 140 - Computing Languages
CpE 100 - Digital Logic Design I

Entertainment Technology Tracks - Total Credits: 18

Each student must complete two of the tracks listed below:

Automation - Credits: 9

EED 330 - Programmable Systems for the Entertainment Industry **
EED 431 - Control Systems for the Entertainment Industry
EED 442 - Animatronics Techniques

Structural Design & Rigging - Credits: 9

CEM 370 - Steel and Wood Design in Construction
CEM 372 - Concrete Design in Construction
EED 320 - Rigging and Structural Design Principles **

Entertainment Venue Design - Credits: 9

CEM 350 - Facility Systems Design and Construction I
CEM 351 - Facility Systems Design and Construction II
EED 451 - Entertainment Venue Design **

Required Fine Arts Electives - Total Credits: 6

Choose two fine art elective courses from the approved list.

AAD 180 - Design Foundation I
ART 107 - Design Fundamentals I
ART 156 - Design Fundamentals III
ART 216 - Sculpture I
ART 419 - Foundry Sculpture
ART 423 - Advanced Printmaking: Screen Printing
EED 310 - Product Design I
EED 320 - Rigging and Structural Design Principles **
EED 330 - Programmable Systems for the Entertainment Industry **
EED 418 - Entertainment Sound IV
EED 432 - Rigging Systems for the Entertainment Industry
EED 441 - Motion Capture
EED 451 - Entertainment Venue Design **
MUS 231 - Recording Technology I
THTR 404 - Theatre Technology II

**Courses marked with ** cannot be used towards both the entertainment technology track areas and the required fine art electives.

Entertainment Technology and Design Minimum Number of Total Credits: 127-133

Notes:

Program Policies

1. Regardless of catalog of graduation, students must satisfy prerequisite and corequisite course requirements as specified in the current Undergraduate Catalog.
2. All prerequisite courses must be completed with a grade of C or better before the subsequent course can be taken.
3. All courses counted towards the degree must be completed with a grade of C or better. ECON 190 satisfies the International requirement. The one free 3-credit social science elective should be selected to satisfy the Multicultural requirement.
4. PHIL 242 will simultaneously satisfy both a humanities requirement and the Second Year Seminar requirement for students obtaining a degree from the College of Engineering that requires more than 120 credits.

1. Is this description correct? If not, what needs to be changed?

Yes, the description for both the EED and ETD degrees are currently correct. The unit has begun the process of redefining the outcomes for the EED degree to align with the expected outcomes of an ABET accredited program. The ETD program may undergo a similar change prior to an initial ABET site evaluation in the Fall of 2020. Similarly, both programs are in process of reducing the credits required to

graduate to 120; however the changes have not been processed or approved by the appropriate curriculum review committees.

Note for internship EED 493: alternative class may be substituted with approval. Although the faculty makes every effort to steer students to an internships, some students have difficulty securing an appropriate internship for the degree program. There is a need to illuminate an alternative path to graduation.

II. Centrality to Mission

A. Department/Program Mission

What is the program's mission statement (or the department's if the program does not have one)?

The EED program's mission is to prepare engineers and technologists for careers in the entertainment industry. The program provides students with a foundation of math, science and engineering practices, along with an understanding of the technology and practices utilized in live entertainment, a sense of design aesthetics, and a sensitivity to the processes involved in the creation of the arts. The program emphasizes a hands-on approach to the practice and requires students to develop creative solutions for the entertainment industry that are reliable, safe, and do enhance the impact of artistic elements.

B. Department/Program Mission Alignment

Briefly describe how this program is aligned to the mission of the University as described in the most recent mission statement, UNLV Mission <https://www.unlv.edu/toptier/vision>, and how it supports achievement of the institution's mission:

Closely aligned with the University's mission, Entertainment Engineering and Design is a unique program that serves to enrich the culture of Las Vegas by propelling innovative thought, and by promoting creative activity and scholarship through the study and intermingling of engineering and the arts. The interdisciplinary program was developed to address the needs of the entertainment industry of Las Vegas and Nevada. A decade old, the program is comparable to only a few other such programs in the country and its graduates now garner the attention of a larger market. The engineers, technologist and artists that the program creates are problem solvers with a solid understanding of engineering fundamentals, and sensitivity to the nature of the arts.

C. Core Themes

Briefly describe how this program supports UNLV's Core Themes (the core themes can be found at: <https://www.unlv.edu/provost/nwccu/core-themes>):

As an interdisciplinary program, the EED program celebrates student achievement in a number of ways. EED students have participated for the last two years in the College of Fine Arts' *Art Walk*. Students' projects have been proudly displayed at the event to demonstrate the students' creative designs and technical skills. Similarly, Entertainment Engineering and Design students participate in the College of Engineering's Senior Design Competition. This capstone event takes place over two semesters and challenges students to engineer and create an innovative project specific to their discipline. The projects are judged by a panel of industry professionals. Student teams are awarded points based on their project presentation, innovation, overall quality, and technical design complexity. Feedback from the judges provides students with valuable information regarding the design process, the commercial viability of the project, patenting information, and continued development. The culmination of the event is an awards ceremony to celebrate the work of the students.

The EED and ETD degree programs encourage students to pursue the elements that make up UNLV's second core theme: research, scholarship, and creative activity. Beginning with the program's foundation classes through to the capstone senior design project, students are taught to research, explore, and experiment within the design process to maximize outcomes.

The Entertainment Engineering and Design program has forged several partnerships with the local community. The program has many ties to local businesses yield internships for EED and ETD students each year. EED faculty and staff have participated in a number of events in support of high school programs and the College of Southern Nevada (CSN) programs.

D. Excellence

List and briefly describe five highlights or areas of excellence of the program:

1. The EED program at UNLV is an innovative and truly interdisciplinary program that has caught the attention of many potential students and industry employers alike.
2. Strategically located in Las Vegas “the Entertainment Capital of the World,” the EED program has developed several close partnerships with the local industry. Students frequently meet with industry leaders and tour facilities housing some of the most technologically advanced performance spaces in the world.
3. EED students enjoy a variety of different career paths. Themed entertainment, gaming design, systems and venue design, event support, product design and experiential design are all potential career trajectories.
4. The EED student constituency is a very diverse population that reflects the diversity of the University.
5. The Entertainment Engineering and Design Advisory Board is extremely supportive of the program and dedicated to student success. Board members have reached out to industry contacts in an effort to create internships and career opportunities specifically suited for EED and ETD majors.

III. External Demand for Program

A. Stakeholders

1. Who are the main local and regional stakeholders of your educational programs, i.e., employers and entities benefiting from these programs, hiring the graduates, or admitting them to graduate and/or professional programs?

The EED program's constituencies are the individuals and groups that have a vested interest in the program and are directly benefited by its' academic quality. Students, alumni, faculty and industry partners make up the EED program's constituencies. Industry stakeholders within the region include the local resorts that rely heavily on technologically driven performances. Themed entertainment, gaming, system venue design firms and many other specialized entertainment production support companies also have an interest in the quality of the program and its graduates.

2. What are specific stakeholder needs for graduates?

The program's stakeholders require EED graduates to have a firm understanding of the demands, processes involved, and importance of aesthetics in relation to live performance and the arts. EED graduates must be well versed in current practices and safety protocols established within the entertainment industry. They must be knowledgeable of emerging technology in the field of live entertainment, be able to use engineering methods to provide safe reliable solutions, communicate effectively, and work in a collaborative team.

B. Needs for Graduates and Future Plans

1. What are the anticipated needs for program graduates over the next 3-5 years? Please cite sources of information.

The Entertainment Engineering and Design program’s original focus was to address the demand for engineers and technicians to support the entertainment industry of Las Vegas. A number of program graduates have established budding careers in the Vegas valley; however, the program is targeting a larger market and is looking ahead to themed entertainment, commercial experiential design, and museum exhibit design as potential career pathways for EED graduates.

In a recent industry study performed by the National Systems Contractor Association, 17,000 jobs were identified nationwide for engineers and technologists in the audio/visual market. A number of EED/ETD graduates are currently working in the field of AV for venue system design and integration. The employment potential indicated in the study applicable to EED and ETD graduates with current median salaries are listed in the diagram that follows.

Rental and Staging Technician	\$55,000
Installation Network Technician	\$55,000
Sales Engineer	\$66,959
Control System Programmers	\$68,000
Design Engineer	\$72,500
Chief Engineer	\$80,000

Entertainment engineering is a new discipline and, as such, there is very limited documentation available that addresses anticipated need for graduates. The Bureau of Labor Statistics (BLS) does not have information specific to the discipline; however, data from the BLS’s most recent Occupational Outlook Handbook of work comparable to that of an entertainment engineer has been included. The diagram below indicates the employment position, expected range of new jobs added between 2014 and 2024, and median salary.

Architectural and engineering managers	5,000 to 9,999	\$75,000
Art directors	1,000 to 4,999	\$75,000
Designers, all other	0 to 999	\$65,000
Electrical engineers	10,000 to 49,999	\$75,000
Electronics engineers, except computer	5,000 to 9,999	\$75,000
Engineers, all other	5,000 to 9,999	\$75,000
Multimedia artists and animators	5,000 to 9,999	\$65,000

Program Review Self-Study
Academic Year 2018–19

Set and exhibit designers	1,000 to 4,999	\$45,000
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2. What changes to the program will those require?

The coursework for the programs is very broad. The tracks for the ETD and the EED degree programs allow the students some specific training; however, graduates are prepared to work in a number of different positions in the industry. As new technology becomes available, the program makes incremental changes in the coursework to address the changing needs of the industry.

C. Success of Graduates

1. What steps does the department take to facilitate the success of graduates (e.g., internships, career fairs, employment talks, etc.)?

The success of EED graduates is a paramount focus. The program, with support from the College of Fine Arts, the College of Engineering and the EED Advisory Board, has engaged in several measures to help ensure that students will launch successful careers in the field of entertainment engineering.

One of the strengths of the program is the availability of local industry professionals to meet with the students. At a minimum, EED and ETD students are required to take four semester of Entertainment Engineering seminar. The seminar offers students the opportunity to meet with a variety of professionals from the industry in a lecture series. Guest lecturers cover a gamut of topics including the challenges of the industry, early career development, employment search tactics, developing a workplace culture of safety, portfolio/resume development, emerging technologies, and networking. The seminar class also affords students the opportunity for field trips to local production companies and showrooms.

The EED program participates in the College of Engineering job fair. Students are encouraged to meet with and discuss the potential internships or employment opportunities with the companies that attend the event.

Internships are emphasized as an important experience for the program’s students. Because of the specialized nature of the work, the program has reached out to develop relationships with a variety local and national production companies. Last year the program celebrated two internships that led to international travel for EED students.

Supported by the College of Fine Arts, the EED program engages in yearly faculty led travel. The travel allows students to travel to and attend industry conventions. In the past two years, the program has supported travel for a number of students to attend the annual United States Institute for Theatre Technology (USITT) conference, the Themed Entertainment Association (TEA) annual conference, and annual conference for the International Association of Amusement Parks and Attractions (IAPPA). At these events, students meet with industry specific employers, attend educational conference sessions, and participate in internship or employment special events.

2. Discuss the placements of recent graduates:

The Entertainment Engineering and Design program has not formally collected any data on the placement of its graduates.

3. If the department or program does not have placement information on graduates, what is the plan to implement gathering that information?

The program has started to issue exit surveys to its graduates. The exit survey includes questions with regard to offers of employment and expected yearly income. In addition, the program has created surveys

for program graduates to be administered every three years after the student’s graduation date. The surveys will enable the graduates to post feedback in relation the program’s strengths and elicit information regarding employment and income. The first graduate survey is scheduled for delivery in 2019.

4. Do placements match stakeholder needs as identified above in A of this section?

The question cannot be answered at this time.

5. If not, please explain:

Sufficient data has not been collected to answer the question.

6. Does the program assess whether the graduates are meeting employer’s needs?

The Entertainment Engineering and Design program is supported by an active Advisory Board, the members of which represent many different specialized facets of the entertainment industry. One of the Board’s functions is to ensure the success of EED and ETD graduates by providing information about changing trends and emerging technologies within the industry. Industry Board members, along with the program faculty, periodically review the EED and ETD programs’ curricula to ensure that students are receiving lessons that are relevant and aligned with the needs of the industry. Many of the companies represented by the Advisory Board have hired program graduates. Board members readily offer information regarding graduate performance and areas within the program that are “on target” with industry needs or requiring improvement.

7. If not, what will the program do to place this NSHE-required assessment in place and by what date?

The program has begun the work of developing and implementing an assessment plan that fulfils the requirements of an ABET accredited engineering program for the EED program. An initial evaluation is scheduled for Fall of 2020. The plan calls for data to be collected from industry stakeholders with regard to graduate performance. Graduates will receive surveys every three years after graduation to comment on the program -providing feedback on the program as they enter the workforce. Additional surveys will be provided to companies that frequently employ EED graduates.

8. Additional comments:

IV. Program Resources

A. Faculty Time

1. Faculty and GA Resources

	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018
Number of Full Time Faculty	2	2	2	2	3	3
Number of State-Supported GA lines	1	1	1	1	1	1
Number of PTIs	1	1	2	1	2	1
Number of FIRS & Visiting Faculty	1	1	0	0	0	0

Program Review Self-Study
Academic Year 2018–19

	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018
Percent of Classes Taught by Full Time Faculty	63%	61%	78%	31%	59%	86%
Percent of Classes Taught by Number of State-Supported GA lines	0%	0%	0%	14%	14%	0%
Percent of Classes Taught by Number of PTIs	10%	0%	6%	14%	27%	14%
Percent of Classes Taught by Number of FIRS & Visiting Faculty	27%	39%	16%	41%	0%	0%

	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018
Student Credit Hours Taught by Full Time Faculty	17.5	11.5	16.5	13	13	19
Student Credit Hours Taught by Number of State-Supported GA lines	0	0	0	3	3	0
Student Credit Hours Taught by Number of PTIs	3	0	1.5	3	6	3
Student Credit Hours Taught by Number of FIRS & Visiting Faculty	7.5	7.5	4	9	0	0

2. For other non-major courses – e .g., upper division for the college or university, estimate the unit’s resources allocated to them:

The unit does not allocate resources to non-major courses.

B. Budget

1. Please fill in the table with three years of financial expenditures to be used to respond to questions 2 and 3 below.

Budget category	FY 15–16	FY 16–17	FY 17–18
State Operating (2101)	\$0	\$0	\$0
Student Fees	\$2000	\$2600	\$2550
Indirect Cost Recovery	\$0	\$0	\$0
Self-supporting	\$0	\$0	\$0
Total Allocations			
Number of Graduate Assistantships (including GAs on grants)	1	1	1

2. Are these resources sufficient to meet the degree program’s instructional and scholarship needs?

Program Review Self-Study
Academic Year 2018–19

The resources available to the EED program are not sufficient. The program’s budget has been supplemented with \$10,000 per year from the CoFA Dean’s discretionary funds. Additional support from both colleges is necessary to provide operational funds and personnel infrastructure to staff the program’s lab spaces with student workers, as well as other resources, such as specialized computer software, hardware, and program-related equipment. The program has been performing at a suboptimal level from lack of resources.

3. If not, approximately what line items and amounts would be needed?

The EED program does not have a dedicated recurring or line item budget for operation. The following table is an estimate based on the initial proposal for the program and the program’s established needs at the time of this writing.

Lab Manager	\$50,000
Student Lab Proctors (2)	\$25,000
Technology Funds (Equipment, tools, computers, software, material, etc.)	\$45,000
Administrative Assistant	\$38,000
Operating Funds (Phones, mail, copying, office supplies, ect.)	\$5,000
Total	\$163,000

C. General Education

1. If your program or unit offers General Education courses, please estimate what portion of the unit’s resources are allocated to this area:

The EED program does not offer General Education courses.

2. Does the combined load from A and B above affect your unit’s ability to offer courses for its major? If so, please describe:

D. Other Funding and Resources

1. Is funding from other sources sufficient to assist the program in achieving its outcomes? Other sources to be considered include: differential tuition, grants and contracts, endowment income, and one-time gifts for student scholarships, other one-time gifts.

No, funding from other sources is not sufficient to assist with achieving the program’s outcomes.

2. If not, which funding streams could most reasonably be increased to help the program attain its outcomes?

The program has considered applying for differential tuition for some of the technology based classes.

3. Has any new donor revenue been generated since the last program review?

Program Review Self-Study
Academic Year 2018–19

This year the program’s Advisory Board instituted an annual membership fee. The money from fees is collected in a discretionary account for the EED program. Approximately \$4300 has been collected from membership fees and other industry pledges.

4. Has the unit engaged in fundraising activities to support the program over the last 5 years? If no, please explain why not:

The program has not engaged in fundraising over the past five years. The previous Director maintained that fundraising was never a stated responsibility, nor was the program adequately assembled to undertake fundraising activities. Since the change in leadership, work towards the ABET accreditation process, formally ratifying the EED Advisory Board, defining a new assessment policy, and reevaluating program curriculum to accommodate a changing market have all been given priority.

5. What has been the result of these fundraising activities?

No results to report at this time.

6. Review the space data for your department and comment on its amount and quality. These data will need to be accessed by an individual with Archibus® access.

At the time of this writing the EED program is scheduled to move into a new space on the UNLV main campus. The new and old information for space allocation has been included in this document in the following tables.

Allocated EED space 2008-2018

SEB 1121	634.74 <i>ft</i> ²	Research Lab *** Conjoined with SEB 1122 ***
SEB 1122	635.41 <i>ft</i> ²	Research Lab
SEB 2231	284.4 <i>3ft</i> ²	Research Lab (Computer Lab)*** Conjoined with SEB 2231A ***
SEB 2231A	278.82 <i>ft</i> ²	Research Lab (Computer Lab)
SEB 3249	140.95 <i>ft</i> ²	Faculty Office
SEB 3250-1	45.39 <i>ft</i> ²	GA/PTI /Student Worker Office***
SEB 3250-2	46.44 <i>ft</i> ²	GA/PTI /Student Worker Office
SEB 3250-3	45.39 <i>ft</i> ²	GA/PTI /Student Worker Office
SEB 3251	157.12 <i>ft</i> ²	Faculty Office

Allocated EED Space 2019

Program Review Self-Study
Academic Year 2018–19

MSL 101	≈ 320 <i>ft</i> ²	Faculty Office
MSL 103	≈ 1275 <i>ft</i> ²	Research Lab
MSL 103A	≈ 437.25 <i>ft</i> ²	Research Lab (Computer Lab)
MSL 103B	≈ 175 <i>ft</i> ²	Faculty Office
MSL 103C	≈ 121.5 <i>ft</i> ²	Faculty Office

For the last ten years, the EED program has occupied spaces in the Science and Engineering Building (SEB), but will be moving to newly allocated spaces in the renovated MSL building.

The first story lab (SEB 1121 and 1122) served multiple functions. The combined lab spaces, at just over 1270*ft*², served as a fabrication shop, electronics workshop, rigging space, intelligent lighting/projection lab, and automation movement laboratory. The high ceiling allowed for the erection of a ground support truss to accommodate work with intelligent lighting, rigging, and automation. The equipment and materials in SEB 1121 and 1122 will move to room MSL 103. The new lab has 5*ft*² of additional floor space and will not allow further growth or development of the program. The new lab has a ten foot high ceiling and will not accommodate the ground support truss. Additionally the new space lacks necessary power to support automation and lighting equipment.

The second story SEB lab served as a computer lab for 3D modeling and design. The computers and equipment in this lab will move to MSL 103A. The new space is approximately 125 *ft*² smaller. The new space will not allow for expansion and will decrease the maximum number of computer workstations.

The EED program continues to integrate new technology into the curriculum. Augmented virtual reality, motion capture, and 3D projection mapping are all emerging technologies in the entertainment industry. An adequate studio workspace has never been available to EED. Though the original proposal for the program called for workspaces to be shared within the colleges, there has never been a designated area fitting or secure for the program to use for this highly specialized work. As the program expands, the need for a dedicated studio work space must be addressed.

7. Is the quality and quantity of available consumable materials and supplies (e.g., office supplies or lab supplies) adequate and if not, explain why not:

Office supplies for the program are supplied by the College of Fine Arts. The office supplies are adequate for the needs of the program. Lab supplies are purchase with the program’s discretionary funds and are adequate.

8. Is the quality and quantity of available technology resources, such as computers adequate and if not, explain why not:

The EED program makes use of 10 powerMacs that have been reassigned from a prior Art Department computer lab. This small number of computers is insufficient to accommodate a typical class size. Instead, the computers serve as an informal support lab for Senior Design students. EED courses make heavy use of specialized software and require robust processor speeds for 3D modeling, prototyping, animation, video and sound. Therefore, EED courses utilizing these kinds of applications are scheduled in lab classrooms across campus, including in FDH and in School of Architecture. This has so far been manageable, but it would be optimal if such a technology-driven program could claim a dedicated

computer lab. EED course make regular use of specialized peripherals, such as 3D printers, and lack of dedicated computing and equipment has proven challenging for classes. Further computer-related technology needed for courses currently being taught include an industry-level media server with accompanying hardware, such as studio monitors and projectors.

The program also makes use of a number of PC's. The PC's have come from industry partners or from faculty members. The PC's are not managed by the Office of Information Technology. The computers are loaded with specialized software for automation programming and control. These computers are frequently reconfigured dependent on changing needs.

9. Is the quality and quantity of available equipment (other than computing) adequate and if not, explain why not:

EED students frequently make use of tools and equipment in the Art Departments sculpting studios and the Mechanical Engineering machine shop. This arrangement has worked well; however, students have commented that access has become increasingly difficult due to demand.

10. Is the quality and quantity of available library and information resources adequate and if not, explain why not:

The quality and quantity of available library and information resources adequately support the EED program's needs.

11. Staffing

a) Are available department staff resources sufficient to attain the program's outcomes?

No, the program does not have any assigned support staff. The program frequently sources tasks to the AA's in the College of Fine Arts. Student workers are used to proctor the lab spaces. The student workers are supported through the Dean's offices of both Fine Arts and Engineering.

b) If not, what additional staff resources are needed and how would they be funded?

The program would benefit greatly from the addition of a dedicated administrative assistant and a full time manager for the lab spaces. The question for funding related to these positions cannot be answered at this time.

12. Additional comments:

V. Size of Program

Program Review Self-Study
Academic Year 2018–19

1. Below are headcount, course enrollment, and degrees conferred data from Decision Support.

<u>Academic Level Key</u>	
Undergraduate (UGRD):	Graduate (GRAD):
10 – Freshman	GR - Graduate
20 – Sophomore	PHD – PhD
30 – Junior	
40 – Senior	
50 – Post Bacc Undergrad	

Headcount:
Headcount declared majors in Entertainment Engr& Design *Preparatory* Only

Plan code 'EEDPRE'

Term	Freshmen	Soph.	Junior	Senior	Senior+
Fall 2010	18	11	11	9	0
Spring 2011	13	6	10	14	0
Fall 2011	19	7	4	19	2
Spring 2012	9	7	4	17	1
Fall 2012	13	6	11	12	0
Spring 2013	4	10	8	13	0
Fall 2013	28	12	7	15	2
Spring 2014	16	8	9	17	2
Fall 2014	27	9	10	15	1
Spring 2015	19	10	12	14	0
Fall 2015	26	12	11	17	1
Spring 2016	20	12	13	10	0
Fall 2016	32	17	13	11	1
Spring 2017	25	16	9	12	2
Fall 2017	25	16	12	9	2
Spring 2018	13	22	11	12	2

Source: PeopleSoft Table PS_LV_CNR_STDNT_CR
PS_LV_CNR_STDNT_CP
Office of Decision Support, August 2018

Program Review Self-Study
Academic Year 2018–19

Headcount declared majors in Entertainment Engr& Design BS

Plan code 'EEDXXXXBS'

Term	Junior	Senior
Fall 2015	0	1
Fall 2016	0	1
Spring 2017	1	2
Fall 2017	2	5
Spring 2018	1	4

Source: PeopleSoft Table PS_LV_CNR_STDNT_CR
PS_LV_CNR_STDNT_CP
Office of Decision Support, August 2018

Headcount declared majors in Entertainment Engr& Design BS

Plan code 'EEDBS'

Term	Freshmen	Soph.	Junior	Senior
Fall 2010	2	2	3	2
Spring 2011	0	2	5	2
Fall 2011	1	0	3	6
Spring 2012	1	0	0	11
Fall 2012	1	1	0	11
Spring 2013	2	2	0	13
Fall 2013	4	1	0	5
Spring 2014	2	1	1	2
Fall 2014	1	1	3	4
Spring 2015	1	2	1	4
Fall 2015	0	2	0	6
Spring 2016	0	2	0	12
Fall 2016	0	0	2	10
Spring 2017	0	0	2	6
Fall 2017	0	0	0	6
Spring 2018	0	0	0	5

Source: PeopleSoft Table PS_LV_CNR_STDNT_CR
PS_LV_CNR_STDNT_CP
Office of Decision Support, August 2018

Program Review Self-Study
Academic Year 2018–19

Headcount declared majors in Entertainment Engr& Design BS and Entertainment Engr& Design *Preparatory* Combined

Plan codes 'EEDBS','EEDXXXXBS','EEDPRE'

Term	Freshmen	Soph.	Junior	Senior	Senior+
Fall 2010	20	13	14	11	0
Spring 2011	13	8	15	16	0
Fall 2011	20	7	7	25	2
Spring 2012	10	7	4	28	1
Fall 2012	14	7	11	23	0
Spring 2013	6	12	8	26	0
Fall 2013	32	13	7	20	2
Spring 2014	18	9	10	19	2
Fall 2014	28	10	13	19	1
Spring 2015	20	12	13	18	0
Fall 2015	26	14	11	24	1
Spring 2016	20	14	13	22	0
Fall 2016	32	17	15	22	1
Spring 2017	25	16	12	20	2
Fall 2017	25	16	14	20	2
Spring 2018	13	22	12	21	2

Source: PeopleSoft Table PS_LV_CNR_STDNT_CR
PS_LV_CNR_STDNT_CP
Office of Decision Support, August 2018

**Course Enrollments:
Department of Engineering and College of Fine Arts enrollments by course subject**

Enrollments in **EED** lecture courses by course level

Term	Level - 100	Level - 200	Level - 300	Level - 400
Fall 2010	31	31	15	1
Spring 2011	32	18	22	4
Fall 2011	26	0	13	11
Spring 2012	12	5	17	27
Fall 2012	38	19	8	32
Spring 2013	22	2	3	29
Fall 2013	40	0	6	8

Program Review Self-Study
Academic Year 2018–19

Enrollments in **EED** lecture courses by course level

Term	Level - 100	Level - 200	Level - 300	Level - 400
Spring 2014	26	7	4	6
Fall 2014	45	20	7	6
Spring 2015	34	12	15	8
Fall 2015	39	29	7	30
Spring 2016	32	19	8	22
Fall 2016	50	34	19	22
Spring 2017	31	27	24	30
Fall 2017	33	44	15	25
Spring 2018	26	23	12	17

Source: PeopleSoft Table PS_LV_CNR_ENRL
Office of Decision Support, August 2018

Enrollments in **HON** lecture courses by course level

Term	Level - 400
Fall 2010	14

Source: PeopleSoft Table PS_LV_CNR_ENRL
Office of Decision Support, July 2018

Enrollments in **CFA** lecture courses by course level

Term	Level - 100
Fall 2012	212
Spring 2013	39
Fall 2013	107
Spring 2014	110
Fall 2014	124
Spring 2015	124
Fall 2015	132
Spring 2016	114
Fall 2016	138

Program Review Self-Study
Academic Year 2018–19

Enrollments in **CFA** lecture courses by course level

Term	Level - 100
Spring 2017	77
Fall 2017	134
Spring 2018	123

Source: PeopleSoft Table PS_LV_CNR_ENRL
Office of Decision Support, July 2018

Degrees Conferred:
Degrees Conferred by Academic Year (July to June)
Entertainment Engr& Design BS and Bachelor of Science in Entertainment Engr& Design
Preparatory

Plan codes 'EEDBS','EEDXXXXBS','EEDPRE'

Academic Year	Degree Count
2011-12	4
2012-13	13
2013-14	4
2014-15	2
2015-16	8

Source: PeopleSoft Table PS_LV_CNR_DEGREES
Office of Decision Support, August 2018

2. Discuss the headcounts from the last five years, i.e., are the trends in line with projections in your unit's strategic plan?

The program has shown some growth over the last five years. The increase in headcount is not as large as projected.

3. If not, why not?

There are a number of potential reasons why the growth rate has not been as large as anticipated. Changes in the local entertainment industry could have hampered the growth of the program. The program has expanded its' scope to include related fields of employment outside the founders' conception.

Until recently, program graduates did not have a proven track record. The lack of history undoubtedly caused many potential students to shy away from the degree.

4. Does your program's enrollment trend differ from national trends?

According to the National Center for Education Statistics (NCES), enrollment between 2010 and 2016 decreased by 7% across the nation. The NCES predicts a 3% increase in enrollment across the nation from 2016 to 2027. Enrollment for the EED program does not match national trends.

5. If yes, please discuss the reasons why:

The differences can be largely attributed to the newness of the program.

6. Additional comments:

VI. Retention, Progression, Completion

A. Major Course Offerings

1. Are enough courses offered to meet enrollment demands?

Within the last two years there has been increased demand for the level 100 and 200 EED foundation classes.

2. How many major courses have been added or eliminated in the last 5 years?

_____ Added _____ Eliminated

There have been many changes to both the EED and ETD degrees over the last five years. A detailed description of all classes that were added, eliminated, or replaced is indicated for both degrees in Section X, subsection B, question 3.

3. Why were the actions taken?

See Section X, subsection B, question 3, part a.

4. After reviewing the program, what additional actions should be taken to improve retention, progression and completion?

Efforts are being made to reduce the overall number of credit hours required for graduation to 120 credits for both the EED and ETD degrees.

5. Are there any courses that students routinely have difficulty getting enrolled in, that slow progression and/or graduation? If so, please identify them:

Yes, the program has witnessed a steady increase in students over the last two years. The program's foundation courses EED 110 Materials Science and Fabrication, and EED 111 Basic Kinetic Structures have traditionally been taught in the Fine Arts sculpting studios, which can only accommodate a maximum capacity of 13 students per class. Ideally EED and ETD students would take these classes in succession during their first two year in the program; however, the classes have been filled to capacity in recent semesters, causing a delay in progression for some students.

6. If last question was answered yes, what steps can be taken to reduce "bottle-necks" in these courses. Please indicate *both* financially-based and non-financially-based solutions.

The program has started to offer the foundation classes every semester to alleviate the problem. Additional part time instructors will be needed to support the foundation classes.

7. Can any changes in sequencing of courses be made to facilitate graduations?

The foundation classes should not be taken out of sequence.

B. Curriculum

1. Is the program’s curriculum aligned with current developments in the field?

According to input from the Entertainment Engineering and Design Advisory Board, the curriculum is largely aligned with current developments and practices in the field; however, the Advisory Board voiced one concern. Their primary concern is that students have more practical experience working with CAD and similar technical design software. The board specified that program graduates should be familiar with interpreting, generating, and manipulating 2D images in an industry standard software - specifically, Autodesk’s CAD software.

2. If not, what needs to be done to make the curriculum current?

AutoCAD is introduced early in the program. The EED faculty has determined that the best method of reinforcing understanding of the software is to introduce more advanced projects in later classes with an Autodesk CAD component.

C. Graduation Rates

Program graduation numbers and rates are summarized below.

Graduation Rates:

Graduation rates for Fall Cohorts

First-time, Full-time College Students declaring Entertainment Engr& Design BS and Entertainment Engr& Design Bachelor of Science *Preparatory* and graduating within 6 years

Plan codes 'EEDBS','EEDXXXXBS','EEDPRE'

Cohort Term	Cohort Size	Degree in Plan	Degree % Plan	Degree in Dept	Degree % Dept	Degree any Dept	Degree % any
Fall 2010	13	2	15.4	2	15.4	5	38.5
Fall 2011	13	4	30.8	4	30.8	7	53.8
Fall 2012	6	1	16.7	1	16.7	2	33.3

Source: PeopleSoft Table PS_LV_CNR_DEGREES
PS_LV_CNR_CP
PS_LV_CNR_CR
Office of Decision Support, August 2018

Using the data in the tables above, please answer the following questions:

1. Are trends in 6-year cohort graduation close to the University’s goals (UNLV’s undergrad goal is 50%)?

The data points do not indicate a consistent pattern of change. An average graduation rate for the EED program calculates to 41.9%. This percentage is under the University’s target goal.

2. If not, what is being done to reach the goal?

The curriculum for the EED and ETD degrees has been under review with the intent of reducing the required credits for graduation to 120. Currently the number of credits required for the EED degree is 129, and the ETD degree requires 127-133 (dependant on track selections). Once the changes are finalized and the required credits are reduced, it is anticipated that the graduation rates for the program will have a marked increase.

3. Discuss how and why the graduation rate is changing.
Additional information must be collected before addressing the question.

4. Additional comments:

VII. Relationship to Other Programs

1. What relationship does your program have to other programs (e.g. articulation, transfers, collaborations, partnerships) in the NSHE system?

The Entertainment Engineering and Design program holds articulation agreements with the College of Southern Nevada for both the EED and ETD degrees.

EED program faculty and staff collaborated with CSN to complete the CADD Lab at CSN's Cheyenne campus. The design lab serves CSN's Technical Theatre and Computer Assisted Design and Drafting programs.

2. What the relationship does this program have to other programs at UNLV (e.g., collaborations, partnerships, affiliated faculty, General Education requirements, etc.)?

Because of the interdisciplinary nature of Entertainment Engineering and Design, the program has many relationships with other programs at UNLV. The program has affiliated faculty in both the College of Fine Arts and the College of Engineering. EED students work alongside Theatre, Dance, Music and Art students to support live performances and installations, but also have opportunities to engage in activities presented by the College of Engineering.

The program's original focus was to support live performance and since its inception EED students have been working within the Theatre department as additional production personnel.

For the last three years, EED students have worked with the Music department's Opera Theatre.

A collaboration with UNLV's Dance department was created for the most recent Art Walk last October. The work featured choreographed dance to the computer controlled lighting and music display of an EED student.

EED students and faculty participated with the teams from Architecture and Engineering to complete the construction of UNLV's entry in the 2017 Solar Decathlon.

3. Additional comments:

VIII. Impact

1. What impact has this program had or will have in the following areas:

a) University

The EED program is a very unique and innovative program that compares to only a few others in the nation. Though the program is still in its infancy, it has made an impact on the University. The Entertainment Engineering and Design program is one of the very first undergraduate interdisciplinary degree programs hosted by two distinct colleges at UNLV. As such, it has served as a pilot program for the organization and management for other inter-college interdisciplinary degrees that will undoubtedly follow. The program has been recognized by industry leaders as having the qualities and potential to be an academic center of excellence and an incubation site for the research and integration of emerging entertainment technologies.

b) Community

The program is committed to enriching the community of Las Vegas and the entertainment industry by developing a culture of safety surrounding the production of live entertainment.

c) Field

As evident from the industry professionals that serve on the Entertainment Engineering and Design Advisory Board, the EED program is closely tied to the entertainment industry in Las Vegas and Nevada. The program addresses the shifting needs of the local industry- producing engineers and technologists to work in the vibrant technology driven field. Outside the city limits, program graduates have entered into careers in themed entertainment, television production, and industrial exhibit design.

The program is working closely with the industry to identify emerging technology and changing trends in the ways in which entertainment is produced and perceived. Experiential immersive design and augmented virtual reality are two areas of research and experimentation that the program has started to investigate.

2. What are the benefits to the institution of offering this program?

See answer to VIII 1 a.

3. Provide examples of the integration of teaching, research, and service (e.g., faculty mentoring leading to student presentations at conferences, service learning classes, community service activities involving students, or other student activities and/or achievements that you think are noteworthy).

EED faculty and students, through their experiential teaching and learning, are a support to other entities serving our community, the business community and the College of Fine Arts. EED faculty and students collaborate with students in multiple disciplines across the University. EED regularly participate in the building, lighting, projection design, automation, and rigging of sets for Nevada Conservatory Theatre and UNLV Opera, which is important support for these community facing venues. In a previous EED class, students engaged in direct research and client interactions to create an interactive augmented reality learning experience supporting an exhibition at the Marjorie Barrick Museum. In another example project, students worked with a local medical firm and created a proposal for a surgical application for augmented reality. EED faculty and staff members provided consultation and assistance with CSN (College of Southern Nevada) during the construction and integration of technology into its new CADD Lab.

The public presentation of projection mapping synchronized to music in the Black Box Theatre serves as an example of the way the EED program fosters experiential learning and the integration of teaching and creative research. The show, named *Glowout*, was the result of EED students' hands-on learning and original creative research in EED 312 Motion Graphics for Projection. Students created original content and produced the show, collaborated with and learned directly from industry specialists in projection from Production Resource Group (PRG) and the projectionist and author Davin Gaddy. This gave the students' work exposure both to the community and to industry, and afforded contract work and commissions for students after the class. This expanded course subject area offering provides students a means of showcasing cutting edge, sought-after skills, and increased touch points for EED in the industry while demonstrating the program's nimble responses to fluidly evolving technologies.

4. Additional comments:

IX. Productivity

1. Please provide an indication of faculty productivity appropriate for your unit (lists of publications by type, grants by type, performances by type, installations by type, etc.):

Within the last five years, EED faculty have been published in 9 journals and 18 conference articles. 13 grant proposals have been funded totaling approximately \$360K. EED faculty have also participated in the design of the user interface and creation of custom illustrations and graphics for a number of games created in conjunction with the International Gaming Institute. The faculty has collaborated with the Music Opera Theatre and Theatre department. Collaborative work includes original design, installation, and consultation on more than 20 productions.

2. Additional comments:

X. Quality

A. Admission and graduation requirements

1. Please insert program admission requirements from the current UNLV catalog. Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.

The current catalog does not indicate admission requirements for either the EED or ETD degree programs.

2. Are there any updates that need to be made to the catalog and if so, what are they?

The following admission requirements should be added to both the EED and ETD catalog pages to be concurrent with the requirements of the College of Engineering.

Admission to the Major

General admission follows college of Engineering requirements. Students transferring from other universities or from other colleges within UNLV who have GPAs of between 2.00 and 2.50 will be admitted on probation and considered to be pre-major students. Admission and transfer policies are described in the College of Engineering section.

3. How many full-time advisors are available at the college level?

EED and ETD students work with one advisor from the College of Engineering. The program has not grown to the point that additional advisors are required to provide service to the students.

B. Outcomes and Assessment

1. Student Learning Outcomes and Program Assessment Plans and Reports by program concentration are listed at <http://provost.unlv.edu/Assessment/plans.html>. Please attach the most recent assessment report in the Appendix.

There are no previously posted assessment reports for the Entertainment Engineering and Design program.

2. Describe specific program changes made based on the program's evaluation of its assessment reports:

Other than the work to establish a functioning assessment plan, no specific changes have been made based on assessment results.

3. Has the program revised its curriculum such as changing prerequisites, adding or eliminating required or elective courses, or co-curricular experiences for the degree(s) in the last 5 years?

Both degree programs have undergone changes in the last five year period. The changes are indicated below:

EED 2012-14

- MATH 283 Vectors and Multivariable Calculus, MATH 431 Ordinary Differential Equation, and STAT 463 Engineering Statistics were added as degree requirements.
- PHYS 151/L and PHYS 152/L were replaced with PHYS 180/L and 182/L.
- PHYS 181/L was added as a required course.
- 9 Fine Arts Electives were removed.
- Changes resulted in increased **required credits to graduate from 137 to 141-144.**

EED 2014-15

- General education core requirements were restructured resulting in a reduction of **total credit requirements to 134-140.**

EED 2015-16

- 3-4 Credits of a Math or Science electives was added.
- 3 Credits of a Fine Art elective was added.
- PHYS 182/L, CS 202 Computer Science II, CPE 200/L Computer Logic Design, CPE 310L Microcontroller System Design, EE 360 Signals and Systems, EE 370L Classical Feedback and Control Systems, ME 421/L Automatic Controls, and ME 380 Fluid Dynamics for Mechanical Engineers were removed from degree requirements.
- CEE 367/L Fluid mechanics, ME 319/L Introduction to Programming for Mechanical Engineers, and ME 330 Analysis of Dynamic Systems were added to requirements.
- EED 210 Multimedia Design, EED 220 Design for Live Entertainment, and EED250 History of Entertainment Technology were added to degree requirements
- CS 135 Computer Science I was replaced with CS 140 Computing Languages.
- Changes made to requirements for emphasis tracks.
 - Structural track added CEE 346 Civil Engineering Materials, and either CEE 444 Steel Structural Design or CEE 482 Design of Timber Structures
 - Acoustics track added ME 434 Noise Control, and either EED 217 Entertainment Sound or MUS 231 Recording Technology.

Program Review Self-Study
Academic Year 2018–19

- Robotics Track added ME 421/L Automatic Controls and ME 425 Robotics.
- Systems and Live Entertainment track added EED 330 Programmable Systems for Live Entertainment, and either EED 431 Control Stems for Live Entertainment or EED 442 Animatronic Techniques required for track.
- **Degree required credits decreased from 134-140 to 129.**

ETD 2013-14

- CEM 457 Construction Management: Project Management was replaced with CEM 457 Project Management or CEE 409 Civil Engineering: Project Management.
- CEE 250L Sustainability in Environmental Engineering was removed.

ETD 2014-15

- Changes made to requirements for emphasis tracks.
 - Automation track added EE 292 Fundamentals of Electrical and Computer Engineering, CS 202 Computer Science II, CPE 200L Computer Logic Design Lab and CPE 310L Embedded System Design Lab.
 - Structural Design and Rigging track added CEM 270 Statics, CEM 370 Structural Steel and Wood Design and EED 320 Rigging and Structural Design Principles.
 - Entertainment Venue Design track added CEM 350 Facility System Design and Construction I, CEM 351 Facility System Design and Construction II, and EED 451 Entertainment Venue Design.
- EED Seminars class credit changed to 1 credit.
- **Required credits decreased from 135-137 to 135-136.**

ETD 2015-16

- AAL 270 Design Communications was removed from the degree requirements.
- THTR 204 Theatre Tech I, THTR 406 Theatre CAD Design were added to the curriculum.
- CEE 409 Engineering Project Management was made a replacement for CEM 457 Project Management (removed from the UNLV catalog.)
- CS 202 was removed from the Automation track.
- **Credit requirements reduced from 135-156 to 132-143.**

ETD 2016-17

- CS 135/L Computer Science I was replaced with CS 140 Computing Languages.
- CPE 200 was removed.
- EED 330 Programmable Systems for Live Entertainment and EED 442 Animatronic Techniques added as options the Automation track.
- EED 217 Entertainment Sound I, EED 317 Entertainment Sound II, and EED 417 Entertainment Sound III were added to the Entertainment Sound Design emphasis track.
- **Required credits were reduced from 132-143 to 127-133.**

a) If yes, what changes were made and why?

4. Has the program revised course content or instructional approaches (pedagogy, technology) in the last 5 years?

a) If yes, what changes were made and why?

Changes to the degrees' requirements over the last five years are a result of a number of different factors. Because of the variety of work that engineers and technologists perform in the industry the

curricula was created to be sufficiently broad. This approach proved to be very problematic in that the required credit hours for graduation were more than any other engineering or fine arts program. A concerted effort was made over several years to decrease to total require credit hours for graduation. The refinement of the emphasis tracks further narrowed the focus of the program to the benefit of the EED and ETD students. As more EED classes came online, specifically designed to present industry relevant material, a number of engineering courses were removed.

5. Describe any other changes made in the last 5 years (for example, advising) based on assessment reports:
6. List and describe two specific improvements in student learning outcomes and why they represent forward movement.

The program has not collected enough data to answer the question.

7. Additional comments:

XI. Conclusions, Self-Assessment

A. Faculty Review of self-study

1. On what date did the program and/or department faculty review this self-study?

The program and department faculty review was completed on January 14, 2019.

2. What were the results of the faculty review?

The faculty made correction and suggested edits to the original document. The changes are reflected in the final document.

3. What are the top 3 priorities and/or needs for the future development of the program?

The program has developed significantly over the last ten years. Much effort has been dedicated to defining the degree programs and ensuring that curricula presented material that was relevant and in touch with industry needs. The program will continue to grow, and as it does, it will need dedicated resources.

Space has been an issue for the EED program. At the time of this writing, the program will be moving into a new facility on the UNLV campus. Despite the loss of the ground support truss unit, the two new lab spaces will quickly fill with materials, tools and supplies. The program needs additional work/studio space in order to set up rigging/automated systems, 3d projection arrays, intelligent lighting, motion capture systems, and augmented virtual reality workstations.

Staffing needs are a priority for the program. The move to a new facility will be more accessible to students. The work space will need to be proctored at all times. There is a search in process for a new Faculty in Residence for the program. Managing and maintaining the lab space will be part of the new FIR's assigned responsibilities; however, because of the open access to the lab, additional support will be necessary to maintain the space. At the minimum, a part-time administrative assistant is also called for, as the program grows, so will the need for this type of support.

4. What are the strengths of the program?

The program has developed many partnerships with the local industry. Ties to the local industry is one of the program's greatest strengths. EED partners provide invaluable insight to trends in entertainment. The program's partners also provide other valuable opportunities for the EED students in the form of guest lecturers, internships, tours, and employment offers. Local support comes in the form of in-kind donation of equipment for the program, and monetary pledges to the EED discretionary fund.

The program is adaptable in a changing market. There has been a shift in the entertainment market in Las Vegas over the last decade. The program continues to prepare EED students for work in traditional entertainment venues, but has also made the necessary steps forward- investigating new emerging technologies and the impact they will make on the future of entertainment. The interdisciplinary nature of the program allows for subtle changes in coursework to keep graduates competitive as they enter the employment market.

5. What are the challenges facing the program?

The program will continue to grow and has little to no dedicated resources. The practical based curriculum requires students to work with the technology currently in play in the industry. Additional support is necessary for the program to remain relevant in a technology driven field.

6. What recent additions, corrections, or other changes have been made to the program that reflect changes or developments in the field?

The program has begun to offer special topic classes in AVR and 3D projection mapping. 3D Projection programmers and system designers have become highly sought after in the employment market. Augmented virtual reality and extended reality are anticipated to change entertainment and the way information is exchange.

B. Other comments

1. Is there anything else you would like to discuss about the program?