

# Entertainment Technology

David B. Smith, Chair  
Voorhees 411  
718.260.5588  
email: dsmith@citytech.cuny.edu

## PROGRAMS:

Entertainment Technology/BTech (STB)  
Lighting Systems Technology/Cert (LSC)  
Scenic Construction/Cert (SCC)  
Show Control/Cert (SHC)  
Sound Systems Technology/Cert (SSC)

## FACULTY:

Professor: Scott  
Assoc Prof: Huntington, Smith  
Asst Prof: Higgins  
CLTs: Eberle, Robinson

## Bachelor of Technology in ENTERTAINMENT TECHNOLOGY

The entertainment industry has grown tremendously in the last twenty years. The increasing prominence of the theme park, the arena concert, the marriage of mall development and amusement, the use of immersive technologies in advertising and marketing, and the expansion of cable and independent television has created an entirely new job market for technicians, managers and designers. City Tech's Entertainment Technology program, the only one of its kind in the Northeast, and one of the few in the world, is designed to address these changes and provide students with the specialized technical course work that is required to work in a variety of professional environments.

The program seeks to provide well-trained graduates for careers as scenery, lighting, sound, video, and show control technicians, technical and production managers, equipment marketing representatives and personnel for distributors and rental houses in the entertainment industry. The program offers additional career options for technicians in the allied fields of film and television production, architectural lighting, display design and construction, trade show exhibitions, club, casino and theme park operations, and all related performing arts production.

The curriculum recognizes the need for specialized technical course work as part of the necessary education for modern stage technicians and managers. The program allows applied science to enhance applied art, giving students a solid foundation of technical principles on which to build their careers.

Recent high school graduates and people with some background in the industry are equally suited to enter the program. Designed as a four-year baccalaureate degree, the

program admits entry-level students in the freshman year who meet the general college criteria for baccalaureate admissions pages 9, 32. In general, this means that the student must be certified in reading, writing and mathematics to be admitted directly into a baccalaureate program.

Through a cooperative agreement with Brooklyn College, City Tech entertainment technology students will have the opportunity to enrich their studies by taking design courses at Brooklyn College. The agreement also permits Brooklyn College students to take specialized technical courses at City Tech. As well, CUNY e-permit guidelines allow students to take courses in many of the other CUNY campuses.

Approximate additional costs other than tuition, student fees and material fees will range from \$700 to \$1,400 for textbooks and tools over the four years of the program.

Entertainment Technology alumni can be found in the professional theatre, in design, installation, and manufacturing shops, in television and concert venues, as well as working with many theatre-related companies in their respective communities. Student technicians receive valuable training by participating in the lighting, sound, costume, video, show control, production, publicity and scenery crews for performances each year. For further information, call 718.260.5588 at the Entertainment Technology office in Voorhees Hall.

### REQUIRED COURSES IN THE MAJOR

		Credits
ENT 1101/ST 101	Introduction to Entertainment Technology	2
ENT 1102/ST 150	Health and Safety in Production	1
ENT 1103/ST 103	Basic Electricity for Live Entertainment	1
ENT 1110/ST 110	Scenery Construction	3
ENT 1250/ST 250	Lighting Technology	3
ENT 1270/ST 271	Sound Technology	3
ENT 2120/ST 120	Technical Production I	1
ENT2140/ST 140	Basic Welding	2
ENT 2200/ST 200	Theatrical Drafting	3
ENT 2210/ST 211	Advanced Scenery Construction	3
ENT 2220/ST 220	Technical Production II	1
ENT 2280/ST 280	Entertainment Control Systems	3
ENT 2350/ST 351	Lighting Controls for Stage and Studio	3
ENT 2370/ST 371	Sound Engineering	3
ENT 3300/ST 300	Theatrical CAD	2
ENT 3320/ST 320	Technical Production III	1
ENT 3410/ST 410	Stage Rigging and Mechanics	2
ENT 3420/ST 420	Technical Production IV	1
ENT 4420/ST 430	Project Management	3
ENT 4499/ST 499	Culmination Project	2
ENT 4900/ST 900	Internship in Entertainment Technology	3
	<b>Subtotal</b>	<b>46</b>

**OTHER REQUIRED COURSES**

CST 1101/CS 101	Computer Programming and Problem Solving	3
THE 1380/TH 380	Play Analysis and Aesthetics	3

**Subtotal** **6**

**DESIGN CORE**

Select two of the following courses for 6 credits.

ENT 4450/ST 450	Lighting Design	3
ENT 4470/ST 471	Sound Design	3
ENT 4480/ST 480	Show Control	3

**Subtotal** **6**

**BACCALAUREATE CORE DISTRIBUTION**

42-43 credits

ENG 1101/EG 101	English Composition I	3
ENG 1121/EG 121 or higher	Communications Elective	3
ENG 2002/EG 202	Introduction to Literature II Drama	3
MA 1 and 2	Mathematics Core	7/8
SCI 1 and 2	Science Core	8
PH1	Philosophy Elective	3
BS/SS	Behavioral Science/Social Science	9
THE 1280/TH 280	History of the Physical Theater	3
SPE 1330/TS 330 or higher <sup>1</sup>	Communications Elective	3

**Subtotal** **42/43**

**ELECTIVE COURSES**

Choose at least 6 courses for 19-20 credits.

An individual plan of study will be developed with the departmental advisor to tailor courses for each individual student from a wide variety of course listings.

A sample listing of elective courses is available in the department office.

Choose at least three elective courses from the following:

ENT 3310/ST 310	Monster Shop	2
ENT 3330/ST 330	Entertainment Video Systems	2
ENT 3360/ST 130	Scene Painting	2
ENT 3390/ST 391	Sound for Multimedia	3
ENT 4421/ST 421	Technical Production V	1
ENT 4422/ST 422	Technical Production VI	1
ENT 4491/ST 900.1	Entertainment Technology Internship II	3
ENT/ST	A third course from the design core list	3

**Subtotal** **20**

**TOTAL CREDITS REQUIRED FOR THE DEGREE** **120**

<sup>1</sup> See page 34 for detailed explanation of core required courses and categories.

**CAREER LADDER CERTIFICATE PROGRAMS****Entertainment Technology Certificate Programs**

City Tech's Entertainment Technology Program offers four certificates - in sound systems technology, lighting systems technology, scenic construction and show control. These certificates are designed for working professionals who want to update their skills and recent BFA/BA graduates who want to expand their technical skills or gain experience with state-of-the-art equipment. Primary and secondary education teachers needing professional development courses can also benefit. Each certificate represents about three semesters of study, although it may take more or less time to complete, depending on course scheduling and the student's work schedule. The basics of each discipline are covered in the first courses; the studies then progress to advanced course work in highly sophisticated labs with individual student use of all equipment and software for each area. Each certificate has its own laboratory with state-of-the-art facilities.

**Requirements for admission to Career Ladder Certificate Program:**

CUNY certification in reading, writing, and mathematics

**Requirements for Matriculates:**

The following may be required based upon placement examinations in reading, writing and mathematics:

ENG 092W/EG 092 Developmental Writing (if required)

ENG 092R/DR 092 Developmental Reading (if required)

MAT 0605/MA 065 Developmental Math (if required)

**Certificate in  
SOUND SYSTEMS TECHNOLOGY**

Sound systems technology covers basic and advanced sound reinforcement, playback systems, rigging and performance audio.

**REQUIRED COURSES IN THE MAJOR****Credits**

ENT 1270/ST 271	Sound Technology	3
CST 1101/CS 101	Computer Programming and Problem Solving	3
ENT 2120/ST 120	Technical Production I	1
ENT 2370/ST 371	Sound Engineering	3
ENT 3410/ST 410	Stage Rigging and Mechanics	2
ENT 4470/ST 471	Sound Design	3

**TOTAL CREDITS REQUIRED FOR CERTIFICATE** **15**

## Certificate in LIGHTING SYSTEMS TECHNOLOGY

Lighting systems technology covers lighting practices, rigging, including moving lights, console programming and technical lighting system design and planning.

REQUIRED COURSES IN THE MAJOR		Credits
ENT 1250/ST 250	Lighting Technology	3
ENT 2120/ST 120	Technical Production I	1
ENT 2200/ST 200	Theatrical Drafting	3
ENT 2350/ST 351	Lighting Controls for Stage and Studio	3
ENT 3410/ST 410	Stage Rigging and Mechanics	2
ENT 4450/ST 450	Lighting Design	3
<b>TOTAL CREDITS REQUIRED FOR CERTIFICATE</b>		<b>15</b>

## Certificate in SCENIC CONSTRUCTION

Scenic construction covers scenic construction techniques from beginning to advanced, with basic drafting and welding techniques.

REQUIRED COURSES IN THE MAJOR		Credits
ENT 1102/ST 150	Health and Safety in Production	1
ENT 1110/ST 110	Scenic Construction	3
ENT 2120/ST 120	Technical Production I	1
ENT 2140/ST 140	Basic Welding	2
ENT 2200/ST 200	Theatrical Drafting	3
ENT 2210/ST 211	Advanced Scenic Construction	3
ENT 3300/ST 300	Theatrical CAD	2
ENT 3410/ST 410	Stage Rigging and Mechanics	2
<b>TOTAL CREDITS REQUIRED FOR CERTIFICATE</b>		<b>17</b>

## Certificate in SHOW CONTROL

Show Control, an advanced certificate for those who have experience in one or more entertainment disciplines (lighting or sound, etc) covers networking and synchronization of entertainment control systems for applications including system contracting, live shows, theme parks, cruise ships, corporate and special events, and themed-retail projects.

REQUIRED COURSES IN THE MAJOR		Credits
ENT 2350/ST 351	Lighting Control Systems for Stage and Studio	3
ENT 2370/ST 371	Sound Engineering	3
CST 1101/CS 101	Computer Programming and Problem Solving	3
ENT 2280/ST 280	Entertainment Control Systems	3
CST 2403/CS 403	Introductory C Programming	4
	or	
ETN 1102/ET 363	Principles of Electronics	3
ENT 4480/ST 480	Show Control	3
<b>TOTAL CREDITS REQUIRED FOR CERTIFICATE</b>		<b>18/19</b>

### COURSES:

#### ENT 1101/ST 101 Introduction to Entertainment Technology

2 cl hrs, 2 cr

An introduction to the live entertainment technology industry, including: working methods, processes, equipment and facilities for theatre, opera, dance, concert productions, theme parks, themed-retail, cruise ship venues, and corporate special events. Related current events and career opportunities will be discussed. Attendance at several of the type of events listed above is required.

*Prerequisites: None*

#### ENT 1102/ST 150 Health and Safety in Production

1 cl hr, 1 cr

A survey of hazards specifically associated with working in theaters and fabrication shops. Topics include chemicals in pigments and polymer plastics; vapors, fumes and ventilation; shop conditions; proper preparation and planning; current OSHA and EPA standards; hazards associated with welding; firearm safety; fire codes. Course is to be taken in the first year as an entertainment technology major.

*Prerequisite: None*

#### ENT 1103/ST 103 Basic Electricity for Live Entertainment

1 cl hr, 1 cr

An introduction to and overview of the use of electricity in live entertainment. Voltage, current, power and resistance are introduced, and Ohm's and Watts' laws are covered using practical examples from the entertainment field. Power generation and

distribution, three phase power, and the National Electric Code sections pertaining to live entertainment are covered. Specific applications for lighting, sound, video, scenic automation will be used throughout the class.

*Prerequisite: None*

#### ENT 1110/ST 110 Scenic Construction

2 cl hrs, 2 lab hrs, 3 cr

A survey of scenery, display and exhibit construction methods involving materials, equipment, counterweight rigging, and performance/exhibit spaces.

Introduces the use of shop tools and safety procedures, scenic flat construction, stairs, soft goods and platform units. Students will read working drawings and prepare projects by working in teams. Basic repair and maintenance procedures for equipment and spaces as used in the scenic process will also be investigated.

*Pre- or corequisites: ENT 1101/ST 101 and ENT 1102/ST 150*

#### ENT 1250/ST 250 Lighting Technology

2 cl hrs, 2 lab hrs, 3 cr

Introduction to stage lighting equipment and its mechanical, optical and electronic design. Hanging, alignment, focusing, maintenance and operation of various types of stage lighting fixtures. Field visits to New York rental shops or manufacturing facilities. Introduction to operation of automated fixtures and peripheral devices.

*Prerequisite: ENT 1101/ST 101, ENT 1103/ST 103*

**ENT 1270/ST 271  
Sound Technology***2 cl hrs, 2 lab hrs, 3 cr*

An introduction to the use of sound in entertainment, its natural properties and physical components. Topics include microphones, recording equipment, control consoles, reproduction techniques, amplification, distribution, loudspeaker systems, frequency response, decibels, and dynamic range. Live and recorded sound techniques and the assembly of small audio systems from diagrams. *Prerequisite: ENT 1101/ST 101, ENT 1103/ST 103*

**ENT 2120, 2220, 3320, 3420, 4421, 4422/ST 120, 220, 320, 420, 421, 422  
Technical Production I, II, III, IV, V, VI***45 lab hrs, 1 cr*

Supervised laboratory in the technical areas of production. Hands-on experience in the planning, construction, rigging and running of productions to learn backstage procedures and operations in a performance situation. Emphasis placed on careful pre-planning, appropriate safety procedures, and on follow-up critiques and evaluation of the work done. Assignments will be made on the basis of the ability and the prior achievements of each student, assuring a variety of work experiences. Each succeeding semester will involve a greater degree of production responsibility. *Prerequisites for ENT 2120/ST 120: ENT 1110/ST 110 or ENT 1250/ST 250 or ENT 1270/ST 271; prerequisite for each succeeding level is successful completion of the prior course*

**ENT 2140/ST 140  
Basic Welding***1 cl hr, 2 lab hrs, 2 cr*

Study of welding techniques including MIG and electric arc welding; use of circuit and current controls, protective devices; and care of equipment and accessories. Metallurgical considerations, electrode and base metal, electrode classifications and welding symbols. Carbon arc welding, oxy-acetylene cutting, MIG, physical testing and analysis of weld specimen are included. *Prerequisite: ENT 1110/ST 110*

**ENT 2200/ST 200  
Theatrical Drafting***2 cl hrs, 2 lab hrs, 3 cr*

Graphic standards for the entertainment industry, including the drafting and interpretation of ground plans, sections, sight line studies, working drawings of individual scenic elements and light plots. Hand drafting, computer-aided drafting programs and related techniques are covered and used. *Prerequisite: ENT 1110/ST 110 or Pre- or corequisite ENT 1250/ST 250*

**ENT 2210/ST 211  
Advanced Scenery Construction***2 cl hrs, 2 lab hrs, 3 cr*

Advanced methods of scenery, display, and exhibit construction, with an emphasis on technical problem solving and research on the use of materials and techniques. Technical drafting of working drawings and the combining of complex scenic elements are examined. Methods of scene shifting and motion control are introduced. *Prerequisites: ENT 1110/ST 110, ENT 2120/ST 120 and ENT 2200/ST 200*

**ENT 2280/ST 280  
Entertainment Control Systems***2 cl hrs, 2 lab hrs, 3 cr*

An introduction to the basics of entertainment control systems, which underlie systems in sound, lighting, machinery, video, projection, pyrotechnics and other entertainment disciplines. The course starts with basic control concepts and data communications. Once the groundwork is laid, control protocols specific to lighting, sound and machinery will be covered. The course also introduces students to Ethernet and show control protocols. *Prerequisites: ENT 1250/ST 250, and ENT 1270/ST 271*

**ENT 2350/ST 351  
Lighting Controls for Stage and Studio***2 cl hrs, 2 lab hrs, 3 cr*

An advanced study of lighting control systems, console programming and automated lighting control. Control system architecture, set-up and communication protocols will be used to study advanced programming techniques. Automated fixtures, advanced dimming systems, color scrollers and traditional lighting fixtures will be studied in a fully functional moving

light lab. Students will receive individual instruction using computer emulation, WYSIWYG simulation and hands-on programming sessions on a variety of consoles. *Prerequisite: ENT 1250/ST 250 and Pre- or corequisite: ENT 2200/ST 200*

**ENT 2370/ST 371  
Sound Engineering***2 cl hrs, 2 lab hrs, 3 cr*

Students will learn to assess acoustics of performance spaces and analyze the results both with instruments and by ear. With these results, students will then learn to design amplification, acoustical modification, and communications systems for professional productions. As a part of the course, they will set up and learn to operate computerized and non-computerized sound control reinforcement and playback systems. *Prerequisite: ENT 1270/ST 271*

**ENT 3300/ST 300  
Theatrical CAD***1 cl hr, 2 lab hrs, 2 cr*

A continuation of ST 200 covering CAD drafting and interpretation of stage plans, 3D modeling, and working drawings of complex three-dimensional scenic elements. Light plots, section views and sound plots will also be covered in depth. *Prerequisite: ENT 2200/ST 200*

**ENT 3310/ST 310  
Monster Shop***1 cl hr, 2 lab hrs, 2 cr*

Special uses of plastics and metals in the fabrication of stage scenery and scenic elements. The major emphasis will be placed on the forming and shaping of various plastics, molds and casting, problems of safety and toxicity, and the selection and use of metals. *Prerequisites: ST 2140/ST 140, ENT 2210/ST 211*

**ENT 3330/ST 330  
Entertainment Video Systems***2 cl hrs, 2 lab hrs, 3 cr*

Provides a theoretical and practical foundation in temporary and permanent video systems technology for entertainment applications such as theatre, corporate events, hotel/ballroom A/V work, theme parks, museums and other related applications. After an introduction to video signals and formats, the student will explore the application and use of a wide variety of video equipment, such as

tape- and disc-based video playback devices, production switchers, scan converters, frame synchronizers and video projectors. The second half of the class will focus on practical applications, and the student will design and build video systems for live events and permanent installations and evaluate the performance of these systems with the aid of test signals and video test equipment. The course will be of interest to students of Entertainment Technology, Electrical Engineering, and Art/Advertising Design. *Prerequisites: ENT 2280/ST 280 or department approval required*

**ENT 3360/ST 130  
Scene Painting***1 cl hr, 3 lab hrs, 2 cr*

An introduction to methods and techniques of painting scenery and properties for the stage. This includes layout for large scale perspective drawing, the process of working from painter's elevations; use of primers, preservatives, proper brushes; and when to use special application methods, materials and textures. The class will focus on interpretation and reproduction of a variety of professional scenic painter's techniques. *Prerequisite: ENT 1110/ST 110*

**ENT 3390/ST 391  
Sound for Multimedia***2 cl hrs, 2 lab hrs, 3 cr*

Introduction to the use of sound in multimedia. Digital multitrack recording and editing is explored, with an emphasis on integration with visual components. Students develop techniques of recording and editing on industry standard software and hardware systems. Digital audio formats, compression protocols, streaming audio, synchronization, and integration with multimedia elements are covered. MIDI and basic sequencing as used in Internet-based playback systems. Importing and exporting audio protocols between a variety of applications. Students will work in an intensive, project-oriented environment, using a variety of applications on the Macintosh platform. It is recommended that AD students bring existing multimedia projects of their own creation to explore how to enhance with additional audio effects. *Prerequisites: AD 620 or AD 720 or AD 650 or ENT 1270/ST 271 or department approval required*

**ENT 3410/ST 410  
Stage Rigging and  
Mechanics**

*1 cl hr, 2 lab hrs, 2 cr*

A study of the principles and methods used in the rigging and flying of stage scenery, and mechanical means of moving scenery on the stage. Emphasis will be on hemp, counterweight and motorized systems; cable drive wagons and turntables; attention to rigging safety and proper care and maintenance of all systems. Field trips include lecture and laboratory demonstrations in working theatrical spaces.

*Prerequisites: ENT 2120/ST 120 and (ENT 2210/ST 211 or ENT 1250/ST 250 or ENT 1270/ST 271)*

**ENT 4430/ST 430  
Project Management**

*3 cl hrs, 3 cr*

An introduction to the methods and problems of running a professional shop and managing projects. Subjects to be covered include: contracts, bidding, estimates, procurement, government regulations, wage/time studies, shop layouts, workflow, the assembly and staffing of a show for performance, budgeting, scheduling, problem solving, special problems (metric vs. US standard measurements, language barriers, conflict resolution, etc.) and political/social issues that affect working relations.

*Prerequisites: ENT 3320/ST 320 and (ENT 2210/ST 211 or ENT 2350/ST 351 or ENT 2370/ST 371)*

**ENT 4450/ST 450  
Lighting Design**

*2 cl hrs, 2 lab hrs, 3 cr*

An introduction to the aesthetics of scenic lighting as a visual art. Analysis of a script for lighting and the development of a workable design concept. Through this concept and an evaluation of the performers' spatial relationships in the production, students will generate light plots and all of the associated paper work common to a production. Computer software and hardware for this purpose will be used in the laboratory. Additional lab work will include color and angle studies, focusing procedures, the design of projected images, and cueing and record keeping for various production formats.

*Pre- or corequisite: ENT 2350/ST 351*

**ENT 4470/ST 471  
Sound Design**

*2 cl hrs, 2 lab hrs, 3 cr*

An investigation of the techniques and practices of sound design, emphasizing the use of modern computer-based recording and playback techniques. Sampling, hard disk playback systems, sequencing, MIDI, systems integration, the use of surround systems, low-frequency elements, and specials to achieve a variety of effects will be covered. Sound design practices will include script analysis, sound cue construction, integration with director and communication with other members of the design team. Additional areas of concentration will be: development of cues based on functional, transitional, underscoring, surreal and hyper-real techniques; integration of musical and soundscape aesthetics; practice on Macintosh computer platforms using Digital Performer, Pro-Tools and a variety of plug-ins; programming of automation equipment and development of robust redundant systems capable of sustaining a high-use theatrical environment.

*Pre- or corequisite: ENT 2370/ST 371 or ENT 2390/ST 391*

**ENT 4480/ST 480  
Show Control**

*2 cl hrs, 2 lab hrs, 3 cr*

An investigation of the advanced techniques and practices of the field of show control, emphasizing the use of modern computer-based entertainment control systems. Techniques for integration of lighting, sound, machinery, video and other control systems, as in live performances, theme parks, themed retail, museum exhibits, and new hybrid entertainment forms. Students will get intensive hands-on experience with many entertainment control systems.

*Prerequisites: CS 101 and ENT 2280/ST 280*

**ENT 4499/ST 499  
Culmination Project**

*1 cl hr, a minimum of 5 independent study hrs per wk, 2 cr*

This course serves as the senior thesis project. The student will either: 1) act in a principal supervisory role in a production as a designer or technical director; 2) propose, design and build a specialized piece of show equipment; or 3) develop a project which utilizes his/her skills in a new and innovative way that relates to or has an impact on the

entertainment industry. All projects must be approved by the adviser and should demonstrate management, technical design and presentation skills. Documentation of planning, design and realization will be presented to a committee of instructors, both in entertainment technology and related disciplines, as well as industry professionals; all are to be selected by the students and approved by the adviser. Though students will enroll in the course during their senior year, development of the project should begin during the second semester of the junior year.

*Prerequisites: ENT 3420/ST 420, ENT 4430/ST 430 and (ENT 4450/ST 450 or ENT 4470/ST 471 or ENT 4480/ST 480)*

**ENT 4900, 4901/ST 900, 900.1  
Internship in  
Entertainment Technology**

*2 cl hrs every other wk, 135  
internship hrs, 3 cr*

Work experience at a professional scenery fabrication shop, rental/supply house, off-Broadway theater, or any related industry organization approved by the adviser. This will serve to bridge the student's academic and commercial careers by giving the student professional work experience and industry contacts before the end of the senior year. Each student will keep a log/journal to be shared in group seminars. Supervision will be by faculty and a manager at the internship site.

*Prerequisites: ENT 4450/ST 450 or ENT 4470/ST 471 or ENT 4480/ST 480*