Division of Mathematics, Science, & Technology

Drafting & Design Technology
Manufacturing Technology
Electronics Technology
General Engineering Technology

Program Review 2018

A PROCESS FOR
SELF-EVALUATION AND
CONTINUOUS IMPROVEMENT

Updated 2018 Rev_2

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PROGRAM: ____Industrial & Design Technologies (IDT)_____

PROGRAM REVIEW TEAM: __Chair: Prof. Vince Benanti_____

Others involved: Drafting & Design and CAD Certificate Prof. Matt King, Electronics Technology Prof. Mauro Marzocco, Manufacturing Technology Adjunct Mark Balzarette, Adjunct Drafting & Design Steve Palladino.

Prof. Emily Vandalovesky, Chair Department of CSEIT.
Dr. PJ Ricatto, Dean – Division of Mathematics, Science & Technology.
Ms. Tonia McKoy and staff; Office of Intuitional Research.

DATE OF THIS REPORT: _____January, 30, 2018_____

PERIOD OF YEARS BEING REVIEWED: _____2007-2018_____

OVERVIEW

State the mission of the program, describe program goals and objectives, describe the relationship to overall college mission and goals, …

Mission Statement for Drafting & Design AAS. & CAD Certificate
To produce qualified design-draftspersons who, in support of architects, engineers or contractors, in diverse technical fields will be able to communicate design information by conventional pencil and sketch drafting, computer aided drafting, and oral communication. To inspire characteristics of professionalism.

Mission Statement for Manufacturing Technology AAS.
To prepare graduates for entry-level positions in machining, grinding, welding, CNC (computer numerical control) programming/machining, industrial design, fixturing and quality assurance/control positions. Students will have a broad exposure to common manufacturing industry methods, procedures and safety.

Mission Statement for Electronics Technology AAS.
This degree program is primarily intended to prepare students for entry-level positions in the electronics industry. The areas of application are diverse, broadly encompassing military & space electronics, communications & avionics electronics, consumer & automotive electronics, and medical & power electronics.

Mission Statement for General Engineering Technology AAS.
This degree program is intended to prepare students for entry-level positions as support personnel with myriad technological skills for the broad area of engineering & technology.

SUMMARY OF SIGNIFICANT DEVELOPMENTS SINCE LAST PROGRAM REVIEW

Provide a brief summary of significant developments since the last program review, with particular emphasis on challenges identified by the previous team, accomplishments relating to the action plans, any work yet to be done, …

2005

The last review was conducted in 2005. The number one recommendation, to hire a full-time faculty member for the Drafting & Design Department was fulfilled. For ten years prior to this, the Drafting & Design program had one full-time faculty member (down from three). It was strongly pointed out that enrollment had dipped during these years from several reasons, however, the inability to recruit and host activities for program awareness that occurred regularly when there were three faculty members was among the largest reasons.

2006-Present

The next development has been the continuous cycling of Academic Assessment of student learning. For the past twelve years we have undergone a number of assessment projects to review and improve specific learning objectives. We have chosen specific courses to conduct these objectives based upon their popularity or have chosen important topics within these courses that effect the students' success within the course. The assessments have been conducted within Manufacturing Technology, Drafting and CAD certificate programs. DFT-107 Drafting I has experienced two assessments. The first focused upon dimensioning. Our faculty, full time and adjuncts have identified dimensioning as one of the most important topics for students to learn. This lesson was reorganized into a Power Point lesson and the method of delivery has the instructor drawing on a touch screen monitor along with the students to demonstrate the process. There was an additional 10-point problem added to the final exam with expectations of 70% success rate on the assessment. The research and tracking had the following results: The new lesson format, after three semesters, and used by four different instructors, gave an average of 82% success compared to 63% with the old lesson format. These ongoing assessment reports will assure that we continue to analyze areas within our programs to seek improvement.

2008

Other major developments since the last review occurred within the Manufacturing Technology Department. In the mid 2000's, the enrollment in the Manufacturing Technology was at an all time low, and the program was endangered of extinction. In 2008, a new faculty was hired, and between 2008-2012 the Manufacturing Technology lab and program underwent a transition. Prior to this, the curriculum featured courses which were too narrow a focus of machine tooling for Milling and Lathe processes. There were multiple levels of courses which built on this topic and it resulted in student attrition and difficult job placement due to its narrow specialty. There were simply not enough industries in the local geographic area that would hire students with this narrow skill set. The transition removed some courses and added new ones, such as Welding, CNC, Industrial Design, and Industrial Electronics to expand the reach of manufacturing skills that better addressed the local industries. This also increased the likelihood of students becoming employed locally upon graduation.

2012

In 2012, four Certificate of Achievement programs were created in addition to the Manufacturing Technology AAS. The COA's are Machine Tooling, Manufacturing Design using Pro/Engineering, Welding Technology, and CNC Programming Technology. In the Drafting & Design AAS program, DFT-209 Engineering graphics II was removed and Civil Engineering Methods and MFG-122 Machine Tool Principles was added.

2013

In 2013 the Electronics and General Engineering Technology AAS programs revised several courses to update and better serve students in theses majors. Many students were not finishing these programs and reaching graduation due to hidden pre-requisites and difficult math requirements. The revisions minimized the hidden pre-requisites and reduced the math requirements. Courses to incorporate a well-rounded student in these majors were added such as machine tooling, metrology, and industrial design. A technical writing course was added to both of these programs in lieu of the previous English Composition II, and Civil Engineering Methods was added to the General Engineering Technology AAS program.

2014 – Present

Introduction of Classroom recording system. The currents system, called Show and Share, allows the lessons to be recorded using three points of access; the teachers computer monitor, the document camera, and a ceiling mounted camera aimed at the markerboards for drawings. The recordings are then linked to Moodle website for student access. This system has been very valuable for student review of the lessons for reinforcement or if absent.

2015

Another significant development is our development of a pathway for an incoming high school student. We have developed several articulations with county high schools in the Drafting & Design, Manufacturing Technology, and Electronics Technology programs. There is also an out of county high school, Passaic County Technical High School (PCTI) which has articulations with all three programs. We are also in the early stages of articulation with another out of county high school – High Tech High School in Hudson County. Our pathway has also been expanded for transfer to New Jersey Institute of Technology (NJIT), School of Architecture. We are currently negotiating the groundwork for a similar articulation with the NJIT Manufacturing program.

Our present and near future planning focuses on a few more curriculum changes in all three programs to replace marginally effective courses with state-of-the-art substitutes. We are continuing to work with NJIT to expand our current course offerings for transfer as well as to continue to build relationships with high schools and add articulations and pathways for incoming and outgoing students.

In the Manufacturing programs, we continue to build partnerships with surrounding industry so students will have an increased opportunity upon graduation.

FOCUS ON STUDENTS

Reflect on the degree to which the program is meeting student needs. Comment on each of the following categories. Some considerations are given after each category—**please comment on only those which are applicable to this program.**

Demographics
[Analysis or examination of the demographics of the students enrolled, special populations being served or not being served, trends and patterns of enrollment, comparisons to other NJ county colleges and national trends, …]

Drafting & Design

Job Growth for Target Occupations, NYC Metro Area*

Target Occupations	2016 Jobs	2026 Jobs	% Change
Mechanical Drafters	2802	2757	-1.6%

Manufacturing Technology

Job Growth for Target Occupations, NYC Metro Area*

Target Occupations	2016 Jobs	2026 Jobs	% Change
Industrial Engineering Technicians	1251	1225	-2.1%
Engine and Other Machine Assemblers	259	297	14.5%
Computer-Controlled Machine Tool Operators, Metal and Plastic	3729	4078	9.4%
Machinists	7551	8228	9.0%

Electrical Technology

Job Growth for Target Occupations, NYC Metro Area*

Target Occupations	2016 Jobs	2026 Jobs	% Change
Electrical and Electronics Engineering Technicians	5006	4953	-1.1%

General Engineering Technology

Job Growth for Target Occupations, NYC Metro Area*

Target Occupations	2016 Jobs	2026 Jobs	% Change
Architectural and Civil Drafters	6670	7140	7.1%
Electrical and Electronics Drafters	1239	1369	10.5%
Mechanical Drafters	2802	2757	-1.6%
Aerospace Engineering and Operations Technicians	657	693	5.4%

**NYC Metro Area includes: NJ counties: Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union NY counties: Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester PA counties: Pike*

Source: EMSI Economic Modeling, NJ Dept. of Labor

It is important to note that the IDT programs are producing graduates with skills in industries where employment potential is dependent upon the state of the economy. Historically, our programs have the highest enrollment during economic downturns, and enrollment is least during economic booms.

Student Satisfaction
[Student surveys of enrollees, transfer students and/or graduates (program-specific or institution-level), qualitative measures for example focus groups or interviews, …]

Machine Tool Principles (Fall 2017)

Text Responses
Question: What did this instructor do well?
Showing how to use each machine
Make the subject interesting and exciting.
Taught the material with interest and enthusiasm. Helped me in the lab whenever I needed. Showed interest in all my questions about the material. I looked forward to class.
Prof. Balzarette is a very knowledgeable teacher. you can tell that he knows his stuff. I'm glad to have a teacher who knows many things like CNC, tools, and much more. it was very pleasant to attend this class with him teaching it.
give the students liberty to work on the projects.
Was very interactive with students and made sure we were on the right path.
Question: How can this instructor make changes to improve this course?
More lab time
Spend more time in the shop.

MFG-130 Welding Technology I (Fall 2017)

Text Responses
Question: What did this instructor do well?
Teach each use of each welding machine
He was really engaged with the students, and helped them figure out how to learn and improve their knowledge and skills
Make the projects and subject matter interesting and fun.
My professor did everything that was needed, never left me or my class mates behind he made sure we were up to date with all our assignments.
teached
Everything. Mark Balzarette is a magic man, whom Heart named their hit song from 1976 after.
Provided useful examples and techniques, he has been welding for somthing like, 30+ years, so.
Provided good advice on projects and worked with students to decide what is within their abilities.

DFT-107 Drafting I (Spring 2018)

Text Responses
Question: What did this instructor do well?
Explain well and helping me what i want or i dont know for my drawing
The lectures were very clear and detailed. The video recordings really came in handy. The assignments were fun. Very helpful with the doubts and questions.
Explain the drawing techniques and make the material clear
Made sure to give tips to students who made errors on previous projects.
I'm not sure how common it is for this to happen, but he would set up 2 or 3 different camera angles directed at where he'd be standing during the lesson, and then he would record his lessons and post them on moodle. This way if i was absent one day and needed to learn the past lesson before showing up next week, i can watch that and pick up the same knowledge as my classmates.
He was able to properly relay the course material in a understandable and engaging manner. Allowing students to get a full grasp on what was expected of them when it came time to do the assignments.

DFT-207 Drafting II (Spring 2018)

Text Responses
Question: What did this instructor do well?
The professor was able to have a positive learning environment for students. He was supportive and motivated students to learn from their mistakes. Overall, this was my favorite class throughout my entire BCC experience.
Layout the course in an order that made understanding the topics easier.
Drawing out what we have to draw effectively and making it easy to understand
Talking
Question: How can this instructor make changes to improve this course?
Honestly, I find this difficult considering how understand the professor was. His lessons were clear and he allowed a good margin of time for students to redo assignments and allow them to learn from their mistakes. Overall, the course was great and needs no significant changes in my opinion.

DFT-210 CAD I (Fall 2015)

Text Responses
Question: What did this instructor do well?
He was very organized and structured. As long as you paid attention in class, asked questions and did the homework assignments, the class was an easy class to manage.
I think that my instructor presented all of the work that we needed to complete extremely well. Also the way he tough was helpfull to learning all of the tools to excel in this course.
Taught the course very well and efficient.
helped me undertand the material in a easy way.
Professor King spoke clearly. He made CAD a very easy subject to learn.
Explained well with a lot of details, exaples and provided good notes.
course outline, homework assigments, testing, clarity of lessons
I just finished taking ESL classes last semester. I was afraid to take this class, because of my English. But, Prof. King was extremely clear and through even better than ESL teachers. He helped me every step of the class. He answered my every little question with patience.
He showed us different way to be able to use autocad. Not just one way but various ways. He took the time to help if a student needed it.
good teacher.
Question: How can this instructor make changes to improve this course?
I dont think he needs to improve. He is top notched and really knows what he is doing.
In my opinion I don't think that he needs to change anything in this course.

Learning Outcomes Assessments

[Documented outcomes, degree of faculty participation in regular assessment activities, results of assessments, what has been learned from assessments, what has changed as a result of assessments, what plans are there for changes in the future, are there appropriate feedback loops to improve student learning, …] Please fill out the chart below and include copies of recent assessment reports.

Program Learning Outcomes (include all program outcomes that are listed in the Academic Catalog)	Describe how the outcome has been directly assessed in the last five-year period.	What have been the results of that assessment? What changes have been made as a result?
Develop three-dimensional rendered drawings using CAD software and add-on software packages. Produce portfolio drawings from final project assignments.	A rubric has been developed and used to grade and evaluate the results of the final projects in DFT-211 CAD II. Grade is worth 10% of course grade.	There was a total of 11 students in the class. There was a total rubric score of 106. 106 divided by 11 students equals an average score 9.63. The desired goal of a minimum of 9 has been achieved.
Identify methods of design technology such as rapid-prototyping, reverse engineering and model making.	A rubric was developed to identify key measurements of student's 3D printed models to determine accuracy.	The desired outcome was an average of 80% accuracy from the class. The results were an average of 87%.
Read and create multi view mechanical drawings compliant to industry standards.	A 10-point problem added to final exam which corresponds to enhanced lesson resulting from the dimensioning assessment project.	The criterion for success for the approximately 75 students will be to achieve an average score of 7.5 out of 10 points on the dimensioning portion of the exam. The pre-test results were 6.4. The post test results after enhanced lesson were 7.0. Additional review of dimensioning has been added to final exam review process to improve this score.
Our graduates can illustrate **pictorial axonometric** and perspective drawings using pencil techniques, CAD, and related software by production of assignments and projects	The assessment is an assigned drawing following the newly expanded and enhanced lesson in Isometric Drafting. This graded drawing assignment, as outlined in the DFT-107 Drafting I syllabus, is one of 12 assignment drawings given during the semester comprising 70% of their final grade.	Total Number students for Isometric assignment: **70** **Average Grade for all students: 3.43 or B+** **Desired Goal of outcome: 3.0 or B**

The Program Assessment forms from the previous five years are included with this program review and can be read in full detail.

Student Success

[Retention and completion rates, placement data, comparison to other colleges in New Jersey and national trends, transfer rates and/or transfer success, graduates' perspectives, employers' perspectives, degree to which students succeed at next educational level, degree to which diverse populations succeed, …]

MATH, SCIENCE AND TECHNOLOGY DIVISION, CAREER PROGRAMS

NUMBER OF DECLARED MAJORS, FALL 2012 – FALL 2016

Career Program Name	Reporting Code	# of Declared Majors				
		Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
Drafting and Design	AAS.IDT.DRFT	79	62	59	49	52
Electronics Technology	AAS.IDT.ELECT.TECH	39	38	30	39	32
General Engineering Technology	AAS.IDT.ENGIN.TECH	79	69	77	52	43
Manufacturing Technology	AAS.IDT.MFG.TECH	21	16	28	24	25
Total Majors		218	185	194	164	152
Computer Aided Drafting	CERT.CAD	9	8	8	6	8
Total Certificate Majors		9	8	8	6	8
CNC Programming	COA.CNC.PROG	1	6	5	3	1
Machine Tooling	COA.MACH.TOOL	2	4	4	3	3
Manufacturing Design using Pro/Engineer	COA.MFG.PROENG	2	3	3	5	3
Welding	COA.WELD	1	1	5	1	4
Total Certificate of Achievement Majors		6	14	17	12	11
Total Career Program Majors		233	207	219	182	171

Source: SURE Enrollment Files, Fall 2012 – Fall 2016

FOCUS ON FACULTY AND STAFF

Reflect on the faculty and staff in the program and the degree to which their needs are met, in order for them to in turn be successful with students. Comment on each of the following categories. Some considerations are given after each category—**please comment on only those which are applicable to this program.**

Demographics
[Demographics of faculty and staff, full-time and part-time, faculty, technicians, support positions, …]

Our full-time and adjunct faculty is comprised of professionals from academia and industry, who are extremely capable of providing the students with an education that allows them to be successful in their path from BCC, whether that be to continue to a four-year college or university or to enter the workforce in their individual interests and career paths.

We are comprised of two registered Architects, Electrical Engineers, Licensed Civil Engineer, Certified Educator in Technology, Certified AutoCAD instructor, Middle school graphic arts teacher, a professional drafter, a manufacturing designer, High School Technology teacher.

We can, therefore, through our varied expertise and professional achievements, offer the students a diverse education that further their success.

Professional Activities
[Special projects, reassigned time, professional organizations, grants, partnerships, publications, presentations, other contributions, …]

Special projects:
We have an affiliation with The Workforce Development Program in providing classes that are part of the CDT Program developed and implemented by Roseanne Crisafi.

Perkins Grants:
Through the Perkins Grant program, since 2006, the department has obtained the following equipment:

- Nikon NPL-322 Laser Transit Surveying equipment,
- (2) 3D printers; Stratasys Dimension 1200es and Stratasys Fortus F270
- Animation workstation with a 14 node Render Farm
- (2) CNC machines; Haas Mini Mill Machining center; Haas S10 Lathe
- Baileigh CNC plasma cutter with two Hypertherm Powermax 65 plasma cutting systems
- Scotchman Iron Worker
- (3) welding Centers; Miller XMT-350 Welders, tables and Fume extractor
- Phase II Rockwell material hardness tester,
- (3) Manual Vertical milling machines and a Belt Grinder
- CAD Lab lifecycle Computer replacements; (2) classrooms with 20 workstations and teachers stations - 42 total workstations.

- Custom Lobby Display Case to showcase our programs work
- Custom Digital signage system to display our students work.

The sum total of above equipment as approved Perkins fund equipment totals to $710,000.00.

Adjunct Faculty
[Hiring, coordination, support, communication, …]

As mentioned in Demographics, we are fully staffed with a very competent and diversely educated and experienced adjunct faculty.
Because of our heavy dependence on computer graphic technology, we rely on both the college's IT Department and Media Technology for support. Both have been extremely helpful in assisting and troubleshooting, and our day to day operation is basically flawless because of their support. We cannot ask for anything better and we thank them for their efforts.

On the down side, the Manufacturing Technology Program is in need of staffing support. There are some critical needs that, when filled, would tremendously help in achieving its goals and student success. The department currently lacks a full time, tenure track faculty member. A full-time faculty can actively assist with outreach and recruitment efforts in this program. It is hoped that this can be resolved in the near future.
Also needed by the program is an experienced adjunct faculty member for the CNC and Machine Tool Principals classes. At this time, with no full-time faculty member, course demand by students is not being met because of insufficient faculty coverage.

Staff
[Secretarial/clerical support, other staff support, …]

As has been the case for many years, our department secretary, Marie Notholt has done an outstanding job in supporting us with any and all administrative needs we have, from processing work orders, creating purchase requisitions, activating Open Lab schedules, acquiring supplies, putting us in touch with students whom called with questions, etc.

Over the past decades, we have always provided open lab hours in Drafting and Design and Manufacturing for our students to be able to come to the college on their own time and work on our equipment to complete assignments, practice their skills, etc. Open lab hours were overseen by college hired Lab Aides. A typical semester has between 40-45 hours of open lab time. Spring Semester 2018 saw a strict limit as to the number of lab aide hours available to the department resulting in an approximate 30% loss of time.
The open lab time is a vital part of our student success rate. Without it, students do not have opportunity to develop and expand their potential.

FOCUS ON CURRICULUM

Reflect on the curriculum for the program—the courses, the scope and sequence, articulation with other institutions, teaching innovations, and other relevant issues—**please comment on only those which are applicable to this program.**

Summary of Program Curriculum
[Degrees, certificates, sequences of courses] Attach copies of Program Learning Outcomes, Curriculum Maps and Master Course Syllabi, where applicable

I. IDT Department Degrees, Certificates, and Certificates of Achievement:

AAS Degrees:
Drafting & Design Technology
Electronics Technology
Manufacturing Technology
General Engineering Technology

Certificates:
CAD

Certificates of Achievement:
Manufacturing Design Using Pro/Engineer
Machine Tooling
Welding Technology
CNC Programming

IIa. Course Sequences AAS Degrees:

Drafting & Design Technology

Code: AAS.IDT.DRFT **Degree: AAS**

First Semester

DFT-107 Drafting I	2
DFT-210 Computer Aided Drafting I	3
WRT-101 English Composition I	3
MFG-122 Machine Tool Principles I	3
Elective Social Sciences Elective*	3
Elective Free Elective†	2
Total credits: 16	

Second Semester

DFT-207 Drafting II	3
DFT-208 Engineering Graphics I	3
WRT-202 Technical Writing	3
Elective Humanities Elective*	3
Elective Free Elective†	3
Total credits: 15	

Third Semester

DFT-209 Civil Engineering Methods	3
DFT-215 Building Systems	3
DFT-262 Architectural Drafting	3
DFT-265 Architectural Practice & Planning	3
HRT-104 Landscape Plants & Materials I	2
PHY-185 Introduction to Physics	4
Total credits: 18	

Fourth Semester

DFT-263 Architectural Design	3
DFT-266 Materials & Methods of Construction	3
DFT-282 Technical Illustration	3
OR	
TEC-180 Problem Solving Using Technology	4
CHM-102 Chemistry in Context	4
DFT-270 Building Information Modeling	3
OR	
DFT-463 Co-0p Work Exp (Drafting)	
Total credits: 16 or 17	
Total Credits: 65 or 66	

*General Education Elective.
†WEX-103 Dynamics of Health and Fitness, (2 cr.) and COMM-100, Speech Communication, (3 cr.) are recommended.
NOTE: *Students enrolled in this program* ***ARE REQUIRED*** *to successfully complete a course in basic algebra if indicated by the Basic Skills Placement Test.*

Manufacturing Technology

Code: AAS.IDT.MFG.TECH Degree: AAS

First Semester

DFT-107 Drafting I	2
MFG-122 Machine Tool Principles I	3
MFG-124 Applied Metrology	3
WRT-101 English Composition I	3
ELC-110 Electric Power Technology OR	4
TEC-180 Problem Solving Using Technology	
Total credits: 15	

Second Semester

MFG-222 Machine Tool Principles II	3
MFG-229 Materials Processing & Fabrication	4
WRT202 Technical Writing	3
Elective Humanitives Elective*	3
Elective Free Elective†	3
Total credits: 16	

Third Semester

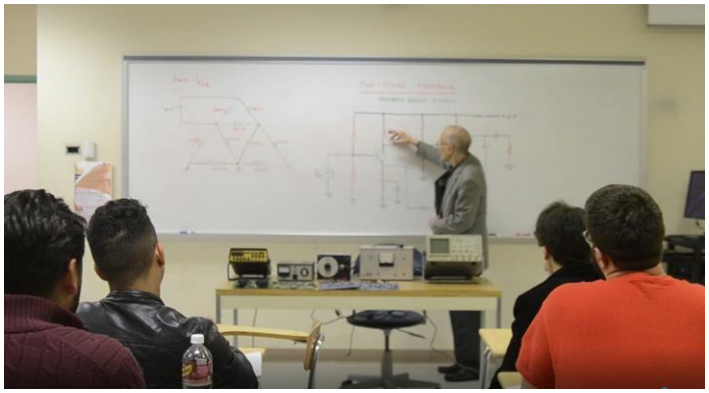
MFG-119 Pro/Engineer Design I	3
MFG-226 Methods, Fixture Design, and Estimating	3
MFG-227 CNC Programming I	4
MFG-130 Welding Technology I	3
PHY-185 Introduction to Physics	4
Total credits: 17	

Fourth Semester

DFT-210 Computer Aided Drafting I	3
MFG-206 Concepts of Industrial Design	3
CHM-102 Chemistry in Context	4
Elective Social Science Elective*	3
Elective Free Elective†	2
MFG-228 CNC Programming II OR	
MFG-463 Co-op Work Experience [Manufacturing]	3
Total credits: 18	
Degree Total Credits: 66	

*General Education Elective.
†SOC-101 recommended.
‡PHR-103 or PHR-105 recommended.
_LAN-113 recommended.
NOTE: *Students enrolled in this program* ***ARE REQUIRED*** *to successfully complete a course in basic algebra if indicated by the Basic Skills Placement Test.*

Electronics Technology



Code: AAS.IDT.ENG.TECH			
Degree: AAS			
First Semester		**Third Semester**	
WRT101 English Composition I	3	WRT202 Technical Writing	3
PHY185 Introduction to Physics	4	DFT107 Drafting I	2
ELC101 DC-Circuit Analysis	4	ELC204 Electronics II	4
TEC180 Problem Solving Using Technology	4	ELC214 Communication Systems I	4
ELC100 Introduction to Electronics Technology	2	MFG122 Machine Tool Principles I	3
Total credits: 17		**Total credits: 16**	
Second Semester		**Fourth Semester**	
COM100 Speech Communication†	3	Humanities Elective*	3
CHM102 Chemistry in Context	4	Social Science Elective*	3
ELC201 AC-Circuit Analysis	4	ELC215 Communication Systems II	4
ELC203 Electronics I	4	MFG124 Applied Metrology	3
WEX101 Dynamics of Health and Fitness	2	MFG206 Concepts of Industrial Design	3
Total credits: 17		**Total credits: 16**	
		Degree Total Credits: 66	

Specific Program Notes
* General Education Elective(s)
† COMM100, Speech Communication, (3 cr.) and WEX101, Dynamics of Health and Fitness, (2 cr.) are recommended.
NOTE: *Students enrolled in this program* ***ARE REQUIRED*** *to successfully complete a course in basic algebra if indicated by the Basic Skills Placement Test.*

General Engineering Technology

Code: AAS.IDT.ENG.TECH Degree: AAS			
First Semester		**Third Semester**	
WRT101 English Composition I	3	WRT202 Technical Writing	3
PHY185 Introduction to Physics	4	ELC204 Electronics II	4
ELC101 DC-Circuit Analysis	4	DFT207 Drafting II	3
TEC180 Problem Solving Using Technology	4	MFG122 Machine Tool Principles I	3
WEX101 Dynamics of Health and Fitness	2	Humanities Elective*	3
Total credits: 17		**Total credits: 16**	
Second Semester		**Fourth Semester**	
COM100 Speech Communication	3	Social Science Elective*	3
CHM102 Chemistry in Context	4	MFG124 Applied Metrology	3
ELC201 AC-Circuit Analysis	4	MFG206 Concepts of Industrial Design	3
ELC203 Electronics I	4	DFT-209 Civil Engineering Methods (Fall only)	3
DFT107 Drafting I	2	DFT210 Computer Aided Drafting I	
Total credits: 17		OR	
		MFG119 Pro/Engineer Design I (Fall only)	3
		Total credits: 15	
		Degree Total Credits: 65	

Specific Program Notes
* General Education Elective(s)
† COMM100, Speech Communication, (3 cr.) and WEX101, Dynamics of Health and Fitness, (2 cr.) are recommended
Note: Students enrolled in this program are required to successfully complete a course in basic algebra if indicated by the Basic Skills Placement Test.

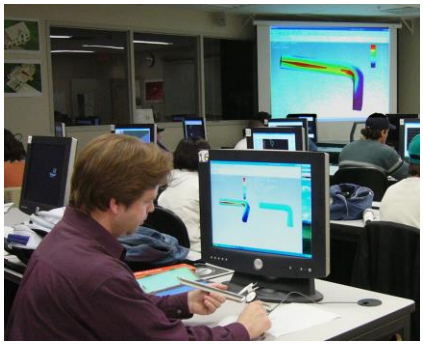
IIb. Course Sequences Certificate:

Computer Aided Drafting

Code: CERT.CAD Degree: CERT F-1 Visa holders should contact their International Student Advisor to discuss enrolling in this program. **First Semester** DFT-107 Drafting I 2 DFT-210 Computer Aided Drafting (CAD) I 3 MFG-122 Machine Tool Principles I 3 WRT-101 English Composition I 3 **Total credits: 11**	**Third Semester** General Education Elective* 3 DFT-212 Computer Aided Drafting (CAD) III 3 DFT-282 Technical Illustration 3 OR TEC-180 Problem Solving using Technology 4 **Total credits: 9-10** **Total Credits: 31 or 32**
Second Semester DFT-207 Drafting II 3 DFT-211 Computer Aided Drafting (CAD) II 5 DFT-208 Engineering Graphics I 3 **Total credits: 11**	**NOTE:** Students enrolled in this program **ARE REQUIRED** to complete MAT-011 (basic mathematics) or test out through the basic skills test, but not required to complete a course in basic algebra if indicated by the basic skills placement test.

IIb. Course Sequences Certificates of Achievement:

Manufacturing Design Using Pro/Engineer (Certificate of Achievement)



Code: COA.MFTG.DESIGN Degree: C of A F-1 Visa holders should contact their International Student Advisor to discuss enrolling in this program. **First Semester** MFG-119 Pro/Engineer Design I 3 MFG-219 Pro/Engineer Design II 3 **Total credits: 6**	**Second Semester** MFG-220 Pro/Engineer Design III 3 MFG-221 Pro/Engineer Design IV 3 **Total credits: 6** **Total Credits: 12**
NOTE: *Students enrolled in this program* ***ARE REQUIRED*** *to complete MAT-011 (basic mathematics) or test out through the basic skills test, but not required to complete a course in basic algebra if indicated by the basic skills placement test.*	

Machine Tooling (Certificate of Achievement)

Code: COA.MACH.TOOL Degree: C of A F-1 Visa holders should contact their International Student Advisor to discuss enrolling in this program. **First Semester** DFT-107 Drafting I 2 DFT-210 Computer Aided Drafting I 3 MFG-122 Machine Tool Principles I 3 **Total credits: 8**	**Second Semester** MFG-119 Pro/Engineer Design I 3 MFG-222 Machine Tool Principles II 3 **Total credits: 6** **Total Credits: 14**
NOTE: Students enrolled in this program **ARE REQUIRED** to complete MAT-011 (basic mathematics) or test out through the basic skills test, but not required to complete a course in basic algebra if indicated by the basic skills placement test.	

Welding (Certificate of Achievement)

Code: COA.Welding Degree: C of A **First Semester** DFT-107 Drafting I 2 MFG-130 Welding Technology I 3 **Total credits: 5**	**Second Semester** MFG-230 Welding Technology II 3 MFG-229 Materials Processing & Fabrication 4 **Total credits: 7** **Total Credits: 12**
NOTE: Students enrolled in this program **ARE REQUIRED** to complete MAT-011 (basic mathematics) or test out through the basic skills test, but not required to complete a course in basic algebra if indicated by the basic skills placement test.	

CNC Programming (Certificate of Achievement)

Code: COA.CNC.Prog Degree: C of A **First Semester** MFG-122 Machine Tool Principles I 3 MFG-227 CNC Programming I 4 **Total credits: 7**	**Second Semester** MFG-228 CNC Programming II 3 DFT-107 Drafting I 2 **Total credits: 5** **Total Credits: 12**
NOTE: Students enrolled in this program **ARE REQUIRED** to complete MAT-011 (basic mathematics) or test out through the basic skills test, but not required to complete a course in basic algebra if indicated by the basic skills placement test.	

III. Program Learning Outcomes:

Drafting & Design Technology

- Read and create multi-view mechanical and architectural drawings compliant to industry standards.
- Demonstrate effective time management responsibility by completing projects with assigned time constraints.
- Develop two-dimensional presentation drawings using computer aided drafting software.
- Communicate graphically and orally in proper technical terminology and in their related systems.

Electronics Technology

- Adjust and repair commercial and consumer electronic equipment as entry level service shop technicians.
- Test, troubleshoot, or prototype electronic products and systems as entry level lab technicians.
- Service and repair installed electronic systems at the user's location as entry level field service technicians.
- Assist in technical writing projects, and for those who excel in oral communications skills, assist in technical marketing or sales.

Manufacturing Technology

- Express and implement all safety rules and procedures across the full scope of machining, welding and fabrication disciplines.
- Recognize the theory and application of precision measurement and will be able to apply these skills in a professional work environment.
- Read multi-view drawings, specify materials and procedures, and construct machined parts to professional standards using manual and CNC machinery.
- Design, specify materials and construct fabricated mechanisms & structures using various measurements, machining, material joining and fabrication techniques for application in a professional environment.
- Demonstrate comprehension of various problem solving techniques and then demonstrate their abilities to apply them to machining, measurement, CNC programming and fabrication disciplines.

General Engineering Technology

- Qualify for entry level positions as Engineering Assistants in basic design and development work, and in computer aided drafting and simulation of actual or conceptual systems.
- Adjust and repair electromechanical equipment as entry level service shop technicians.
- Test, troubleshoot, or prototype electromechanical products and systems as entry level lab technicians.
- Service and repair installed electromechanical systems at the user's location as entry level field service technicians.
- Assist in technical writing projects, and for those who excel in oral communications skills, assist in technical marketing or sales.

CAD Certificate

- Read and create multi view mechanical drawings compliant to industry standards.
- Demonstrate effective time management responsibility by completing projects with assigned time constraints.
- Develop three-dimensional rendered drawings using CAD software and add-on software packages. Produce portfolio drawings from final project assignments.
- Identify methods of design technology such as rapid-prototyping, reverse engineering and model making.
- Implement common presentation software used to further enhance CAD rendered images.

CNC Programming Certificate of Achievement

- Express and implement all safety rules and procedures across the full scope of machining, welding and fabrication disciplines.
- Demonstrate various problem-solving techniques and apply them to machining, measurement, CNC programming and fabrication disciplines.
- Specify materials, develop an order of operations and determine appropriate use of machinery for the construction of CNC produced mechanical parts.
- Develop CNC programs using G and M code programming language, load programs to the machine, troubleshoot problems and produce parts using professional techniques and equipment.

Machine Tooling Certificate of Achievement

- Express and implement all safety rules and procedures across the full scope of machining, welding and fabrication disciplines.
- Recognize the theory and application of precision measurement and will be able to apply these skills in a professional work environment.
- Design, specify materials and construct fabricated mechanisms & structures using various measurements, machining, material joining and fabrication techniques for application in a professional environment.

Manufacturing Design Using Pro/Engineer® Software Certificate of Achievement

- Demonstrate competency with the basic design skills used within Pro/Engineer software, and comfortably navigate through the graphical user interface.
- Recognize the design techniques available within the Pro/Engineer software critical to creating a flexible parametric design necessary for a more streamlined manufacturing process.
- Communicate with their peers a comprehensive knowledge of their Pro/Engineer software design process in order to prepare for real world situations.
- Develop and complete all necessary electronic and hardcopy deliverables required for typical design process utilizing Pro/Engineer software.

Welding Technology Certificate of Achievement

- Express and implement all safety rules and procedures across the full scope of machining, welding and fabrication disciplines.
- Recognize the theory and application of precision measurement and will be able to apply these skills in a professional work environment.
- Demonstrate an understanding and application of safety rules and procedures related to the use of electrical equipment, welding gases and arc/gas welding procedures.
- Demonstrate an understanding of electrical and gas and arc welding theory.
- Apply appropriate processes and demonstrate proficiency to create welded joints in various ferrous and nonferrous metals.

Curricular Issues

[Articulation, program development, course development]

DFT-208 Engineering Graphics I

After reviewing the status of the course and the transferability of the credits for this class, it has been decided that a change will be made to modernize this course. This change will also comply with many local four-year colleges for transferability into their Engineering Programs. It will be proposed to the Academic Senate to change the name of Engineering Graphics I to Engineering Graphics using Solidworks. This will also require changes to the course content. A preliminary change to the content was conducted in the Fall 2017 and Spring 2018 semesters with very good student response and success.

Lead-in Courses

[Developmental preparation, prior courses and their impact, alignment with general education courses, dual enrollment or articulation agreements with high schools, …]

BERGEN COMMUNITY COLLEGE
Dual Enrollment Courses
2018-2019

High School	***Course Code***	***Course***
Applied Tech High School		
(BCC campus)	Mfg-122	Machine Tool Principles I
	Dft-210	Computer Aided Drafting I
Cliffside Park	Dft-210 ***418se***	Computer Aided Drafting

Garfield	Dft-107		Drafting
	Dft-210		CAD I
	Dft-207		Drafting II
Hackensack	Dft-210	***454se***	CAD I
	Mfg-122		Machine Tool Principles
	Mfg-130		Welding Technology
Mahwah	Dft-107	***490se***	Drafting I
Northern Highlands	Dft-107		Drafting I
Paramus	Dft-210	***517se***	Computer Aided Drafting I
Passaic County Tech.	Dft-107	***602se***	Drafting I
	Dft-207		Drafting II
	Dft-210		Computer Aided Drafting
	Dft-262		Architectural Drafting
	Elc-100		Intro to Electronics
	Elc-101		DC Circuit Analysis
	Elc-201		AC-Circuit Analysis
	Elc-203		Electronics I
	Mfg-122		Machine Tool Principles
	Mfg-124		Applied Metrology
	Mfg-227		CNC Programming I
Westwood	Dft-210		CAD I

Data Needs

What additional data that is currently not available would have been helpful to effectively evaluate this area of the program?

High School Articulations:
There should be data available for IDT which reflects the number of students articulated in our program which counts towards our enrollment totals.

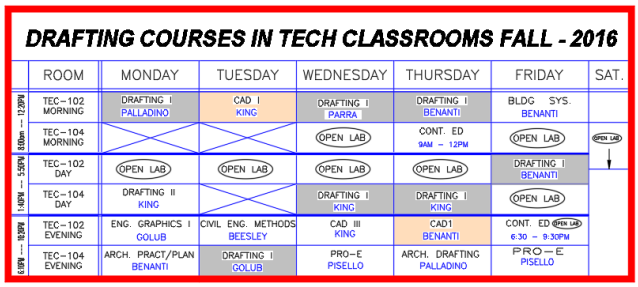
Class rosters should reflect that high school articulated students be identified with an asterisk for the advanced courses taken at BCC in the major. This way, faculty can track their progress.

Scheduling

[Enrollment patterns and trends; time and date issues such as day, afternoon, evening, or weekend, format issues such as self-paced, distance, or short-term; …]

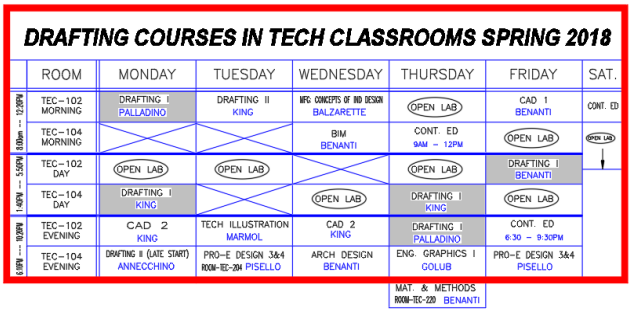
Below you will see typical Fall/Spring course scheduling for Drafting & Design, Manufacturing, and Electrical Technology. In addition, there were different years chosen.

Drafting & Design Technology: Typical Fall/Spring Course offerings



DRAFTING COURSES IN TECH CLASSROOMS FALL - 2016

	ROOM	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT.
8:00am – 12:20PM	TEC–102 MORNING	DRAFTING I PALLADINO	CAD I KING	DRAFTING I PARRA	DRAFTING I BENANTI	BLDG SYS. BENANTI	
	TEC–104 MORNING			OPEN LAB	CONT. ED 9AM – 12PM	OPEN LAB	OPEN LAB
1:40PM – 5:50PM	TEC–102 DAY	OPEN LAB	OPEN LAB	OPEN LAB	OPEN LAB	DRAFTING I BENANTI	
	TEC–104 DAY	DRAFTING II KING		DRAFTING I KING	DRAFTING I KING	OPEN LAB	
6:00PM – 10:20PM	TEC–102 EVENING	ENG. GRAPHICS I GOLUB	CIVIL ENG. METHODS BEESLEY	CAD III KING	CAD1 BENANTI	CONT. ED 6:30 – 9:30PM OPEN LAB	
	TEC–104 EVENING	ARCH. PRACT/PLAN BENANTI	DRAFTING I GOLUB	PRO–E PISELLO	ARCH. DRAFTING PALLADINO	PRO–E PISELLO	



DRAFTING COURSES IN TECH CLASSROOMS SPRING 2018

	ROOM	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT.
8:00am – 12:20PM	TEC–102 MORNING	DRAFTING I PALLADINO	DRAFTING II KING	MFG CONCEPTS OF IND DESIGN BALZARETTE	OPEN LAB	CAD 1 BENANTI	CONT. ED
	TEC–104 MORNING			BIM BENANTI	CONT. ED 9AM – 12PM	OPEN LAB	OPEN LAB
1:40PM – 5:50PM	TEC–102 DAY	OPEN LAB	OPEN LAB		OPEN LAB	DRAFTING I BENANTI	
	TEC–104 DAY	DRAFTING I KING		OPEN LAB	DRAFTING I KING	OPEN LAB	
6:00PM – 10:20PM	TEC–102 EVENING	CAD 2 KING	TECH ILLUSTRATION MARMOL	CAD 2 KING	DRAFTING I PALLADINO	CONT. ED 6:30 – 9:30PM	
	TEC–104 EVENING	DRAFTING II (LATE START) ANNECCHINO	PRO–E DESIGN 3&4 ROOM–TEC–204 PISELLO	ARCH DESIGN BENANTI	ENG. GRAPHICS I GOLUB MAT. & METHODS ROOM–TEC–220 BENANTI	PRO–E DESIGN 3&4 PISELLO	

Manufacturing Technology: Typical Fall/Spring Course offerings

Fall 2018	Open	MFG-119-601 Pro/Engineer Design I		Paramus	09/05/2018-10/26/2018 Lecture Wednesday 06:15PM - 10:30PM, The Technology Building, Room TEC-104 (more)... First Seven Weeks.
Fall 2018	Open	MFG-122-601 Machine Tool Prin I		Paramus	09/05/2018-12/22/2018 Lecture Thursday 06:10PM - 10:15PM, The Technology Building, Room TEC-101
Fall 2018	Open	MFG-122-602 Machine Tool Prin I		Paramus	09/05/2018-12/22/2018 Lecture Tuesday 06:10PM - 10:20PM, The Technology Building, Room TEC-101
Fall 2018	Open	MFG-124-601 Applied Metrology		Paramus	09/05/2018-12/22/2018 Lecture Monday 06:10PM - 10:15PM, The Technology Building, Room TEC-205
Fall 2018	Open	MFG-130-601 Welding Technology I		Paramus	09/05/2018-12/22/2018 Lecture Wednesday 06:10PM - 10:20PM, The Technology Building, Room TEC-101
Fall 2018	Open	MFG-227-601 CNC Programming I		Paramus	09/05/2018-12/22/2018 Lecture Monday 06:10PM - 08:55PM, The Technology Building, Room TEC-101 (more)...

Spring 2018	Open	MFG-122-111AT Machine Tool Prin I		Paramus	01/19/2018-05/07/2018 Lecture Monday, Friday 12:40PM - 02:35PM, The Technology Building, Room TEC-101
Spring 2018	Open	MFG-124-601 Applied Metrology		Paramus	01/16/2018-05/08/2018 Lecture Monday 06:10PM - 10:15PM, The Technology Building, Room TEC-205
Spring 2018	Open	MFG-206-001 Concepts of Industrial Design		Paramus	01/16/2018-05/08/2018 Lecture Wednesday 09:00AM - 01:25PM, The Technology Building, Room TEC-102
Spring 2018	Open	MFG-220-601 Pro/Engineer Design III		Paramus	01/24/2018-03/16/2018 Lecture Wednesday 06:15PM - 10:30PM, The Technology Building, Room TEC-204 (more)... First seven weeks
Spring 2018	Open	MFG-221-601LS Pro/Engineer Design IV		Paramus	03/20/2018-05/08/2018 Lecture Tuesday 06:15PM - 10:30PM, The Technology Building, Room TEC-104 (more)... Second Seven Weeks
Spring 2018	Open	MFG-228-601 CNC Programming II		Paramus	01/18/2018-05/03/2018 Lecture Thursday 06:10PM - 10:30PM, Pitkin Education Center, Room S-346

Electronics Technology: Typical Fall/Spring Course offerings

Fall 2018	Open	ELC-100-001 Intro Electronics Tech		Paramus	09/06/2018-12/20/2018 Lecture Thursday 03:15PM - 06:00PM, Pitkin Education Center, Room S-249
Fall 2018	Open	ELC-101-001 DC Circuit Analysis		Paramus	09/05/2018-12/22/2018 Laboratory Monday, Wednesday 03:15PM - 06:00PM, Pitkin Education Center, Room S-249
Fall 2018	Open	ELC-201-601 AC Circuit Analysis		Paramus	09/06/2018-12/20/2018 Laboratory Tuesday, Thursday 06:20PM - 09:05PM, Pitkin Education Center, Room S-249
Fall 2018	Open	ELC-203-601 Electronics I		Paramus	09/05/2018-12/22/2018 Laboratory Monday 06:20PM - 09:05PM, Pitkin Education Center, Room S-249 (more)...

Spring 2018	Open	ELC-100-601 Intro Electronics Tech		Paramus	01/16/2018-05/08/2018 Lecture Thursday 06:20PM - 09:05PM, Pitkin Education Center, Room S-249
Spring 2018	Open	ELC-101-601 DC Circuit Analysis		Paramus	01/16/2018-05/08/2018 Lecture Monday 06:20PM - 09:05PM, Pitkin Education Center, Room S-249 (more)...
Spring 2018	Open	ELC-201-001 AC Circuit Analysis		Paramus	01/16/2018-05/08/2018 Laboratory Monday, Wednesday 03:15PM - 06:00PM, Pitkin Education Center, Room S-249
Spring 2018	Open	ELC-204-601 Electronics II		Paramus	01/16/2018-05/08/2018 Lecture Tuesday 06:20PM - 09:05PM, Pitkin Education Center, Room S-249 (more)...

100 level courses are generally listed during the morning/day and second year mostly at night unless there are multiple sections. For single second-year sections, students are polled as to the optimum time for the offering. If the poll results are split, we have flip flopped the class from night to morning/day in alternating semesters to accommodate all students.

Assessment

[Ways in which the program addresses the college's commitment to assessment and assesses its program learning outcomes, changes that have been made to the curriculum as a result of assessment, …]

The IDT Department is on a continuous assessment cycle for all of the program courses. Faculty classroom evaluation is always performed on a regular cycle and as required by the college.

Innovations or Changes in Last Five Years

[New issues, significant changes, improved methodologies, …]

The following changes designated as improvements have been added to the Drafting & Design, Manufacturing Technology, and Electronics Technology programs:

In order to have a better a better alignment with NJIT School of Architecture and the transfer of credit, we have, over the past five years, revised our course content and student work for five of the Drafting and Design classes. These changes have proven to be very successful for our students transferring into NJIT program and being able to get credit for required classes. At this time these five course, with a portfolio review, will directly transfer in the School of Architecture program.

In conjunction with the program assessment process, two capstone lessons in DFT-107 Drafting I, the most successfully enrolled class in the Drafting & Design Program with an average of 14 sections offered annually, were rebuilt and improved. The lessons in Dimensioning and Sectioning were rewritten to be used with a touch screen monitor driven by a PowerPoint slide show to deliver a lesson that can be saved and posted with the instructor's mark-ups for the student to review. This results in a student interactive lesson for improved comprehension. Other lessons in Drafting I and Drafting II have been rewritten to follow that model.

The Manufacturing Technology program has benefited from the Perkins grant to be awarded new equipment for a better student learning experience. Two "antiquated" CNC machines were replaced with new state-of-the-art CNC machines with six control units for a highly improved student to machine ratio. Recently, again due to Perkins, three new Vertical Manual Milling machines were added to the existing three machines. These machines are used mostly be the MFG-122 Machine Tool Principles I class, the most successful Manufacturing Technology enrolled course offered. Prior to these new machines, there was a poor student to machine ratio

of 15 students to 3 machines. That caused bottleneck scenarios of inactive student waiting for machine access. This will now be vastly improved.

Another project for improvement that is in progress as of this writing is to replace the lighting in the Manufacturing Technology Lab. The existing lighting does not meet OSHA standard for proper illumination. The existing lights also emit a buzzing sound that is distracting and creates a difficulty of clearly hearing the instructor. The new lights will eliminate these problems and improved learning environment.

In the Tec-102 and Tec-104 labs, the ceiling mounted computer projectors, screens, teacher's computer workstations including all the electronic equipment necessary for the projection system and lesson recording was replaced. This was a large technical undertaking which involved cooperation from IT, Media Technologies, and the instructors whom use the system. The results were a vastly improved system that was a larger, brighter, and more reliable system which the students benefit from.

The Electronics Technology Program has hired two adjuncts bringing additional expertise, energy and innovation potential to the program to help grow enrollment for the Electronics and General Engineering Technology Programs.

FOCUS ON SUPPORT

Reflect on the support issues related to this program — **please comment on only those which are applicable to this program.** To what degree are they met, where are there kudos to be given, changes that have taken place, improvements to be made, …?

Technology
[Hardware and software, technical issues and/or support, instructional issues and/or support, training for faculty, …]

To grasp the technology and technological issues, here is a list of Programs, rooms, and equipment:
Drafting & Design/CAD Certificate Tec-102 & Tec-104;
Hardware
(40) Workstation Computers networked to Server located in B-110 Computer Room
(2) Teachers Computer station with document camera, DVD, Crestron unit, color laser printer, and Show & Share recording system.
(4) Large format plotters
(1) Animation Workstation networked to Render Server and 12 node render farm in B-110
(2) 3D Printers
(1) Laser Engraver
(1) White Printer

Workstation Software:

AutoCAD	SolidWorks
AutoCAD Architecture	Adobe CC
REVIT	MS Office
3DS Max	3D Printer Software
NavisWorks	
Fusion 360	
AutoSketch	

FTP web site access. This allows students to upload (similar to the cloud) large and small files to a web site maintained by the college. Then the instructor can access the files for review and assessment. This has proven to be a valuable asset for the instructors that utilize this system.

Manufacturing Technology: Tec-101 & Tec-101A;

(2) CNC Machines – Mini Mill and Lathe
(6) CNC Controller Units
(4) Workstation Computers
(1) Teachers Computer
(1) Dedicated computer for CMM (Coordinate Machine)
(1) Smartboard in Tec-101a classroom
(1) Dedicated computer workstation for CNC Plasma cutter
(5) Welders

Workstation Software:

Same as above in Drafting & Design
MasterCAM
UCannest for Plasma Cutter

Electronics Technology/General Engineering Technology: S-249

20 computer/electronics workstations
10 oscilloscopes
10 signal generators
10 power supplies
20 analog multimeters
20 digital multimeters

Workstation Software:

MultiSim V.11 electronic simulation software.

It is mandatory that the IDT programs require the most current hardware and software. For the Drafting & Design program, there is a lot of mixed hardware and software needs that create challenges to keep everything running properly. The BCC OIT and Media Technology Department has been the unsung heroes in successfully accomplishing this task. There is an annual CAD Lab (Tec-102 and Tec-104) maintenance upgrade project which is a large undertaking of adding the latest software for the next academic years use. It requires a faculty member, OIT, and an outside consultant to accomplish this task. The entire process takes two

weeks if all goes smoothly. The faculty member must coordinate, supervise the process, participate in trouble shooting and verify successes.

During the academic year, OIT staff has been very helpful in maintaining smooth operation for the computers and servers. The system of calling helpdesk to generate a ticket, and then having a Tech come to the classroom to access and initiate a repair or fix has worked very well during daytime business hours. Our complaint/suggestion would be for increased assistance for night classes.

Facilities and Equipment
[Cycles for replacement or refurbishment of equipment, classroom spaces, labs, furniture, concerns, needs, …]
Hardware: The OIT department has been very cooperative with hardware and software replacement. The typical lifecycle for the IDT computers has been four years. In the third year, OIT will contact a faculty member to initiate the process of gathering specifications for the new equipment. The Server is housed in the B-110 Pitkin Building server room. It is temperature controlled and monitored by OIT staff. The networking is also monitored and maintained by OIT staff. Problems are addressed by calling into Helpdesk and establishing a ticket which is a case that is assigned to an OIT technician whom then attempts to solve the problem. Wait times have been typically short and efficient. We are very happy with the system with one exception – night classes including Friday evening and Saturday mornings are vulnerable to little or no help.
Software: Several of the software programs require annual license upgrades. The OIT department consistently emails early warning to an appointed IDT faculty to indicate that the software license needs renewing. New quotations are prepared and sent in to OIT to begin the process of generating PO's and approvals before placing the order. This process should be done **at least** 3 months prior to expiration of the software license.

Learning Resources
[Collection of books, databases, journals, videos, …; learning assistance or tutoring, …]

Drafting & Design

1. Books - Architectural Graphics Standards. Major architectural reference available to students in the Drafting & Design classrooms as well as the BCC library.
2. Books - Drawing Requirements Manual 11th Edition. Master standards manual for mechanical drafting available to students in the Drafting & Design classrooms as well as the BCC library.
3. Journals – Architectural Digest Magazine. Collection of magazines for reference available to students in the Drafting & Design classrooms.
4. Video – Architectural Drafting. Delmar Architectural Drafting video series. Videos shown each week to correspond to lessons.
5. Online Subscription – Lifetime subscription to Digital Juice used in DFT-212 CAD 3 class. Online site contains downloadable video content for animation clips, background stills and looping short video clips, etc.

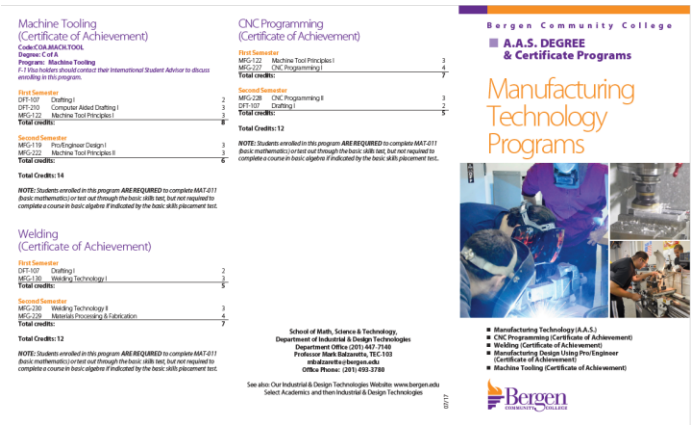
6. Moodle and Show & Share – Many Drafting classes utilize Moodle web site provided by the college to post assignments, handouts, and reference materials. Moodle has become an excellent resource for the students.
   The Tec-102 and Tec-104 CAD Labs are also privileged to have a CISCO Show & Share recording system installed at the teacher's computer workstations. The Show & Share systems allow recording at four points; The teacher's computer monitor, documents camera, a ceiling mounted pivoting camera for markerboard drawings with a 180-degree rotating angle, and an audio microphone. The lessons may be recorded from all the mediums and stored on the college server. There is a link within the students Moodle account to access the Show & Share site to view and display all the semesters recordings. This system has been temperamental and requires frequent intervention from Media Technologies and OIT. They have been patient and excellent with their assistance in maintaining Show & Share function. Sometimes, they would arrive from across campus within a couple of minutes to make sure you can use the system. Despite the technical problems experienced, the advantages for the students to access previous lessons has been invaluable and elevates the value of our program. Multiple times students would thank us for the capability to review the lesson for a better learning experience.

Marketing and Public Relations
[Brochures, print materials, website, special events, recruitment efforts, …]

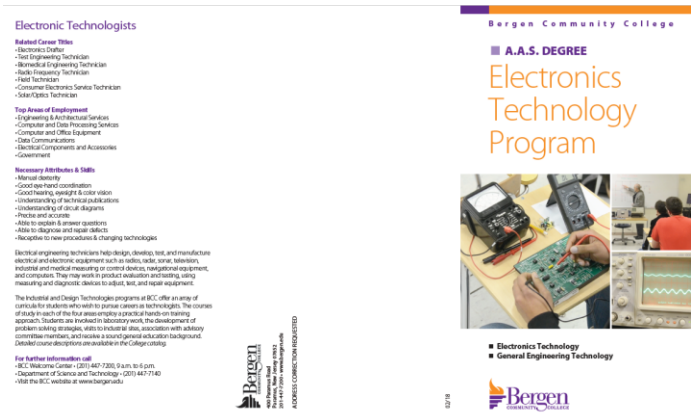
Brochures from each program (reduced in size for the purpose of fitting on one page)

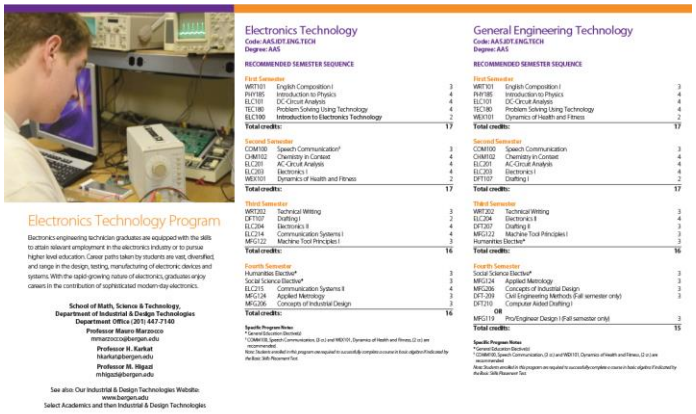
Drafting & Design AAS and CAD Certificate programs

Manufacturing Technology AAS and COA's: Welding, Machine Tooling, CNC, and MFG Design Pro/E



Electronics Technology AAS and General Engineering Technology AAS





There are several printed brochures and posters that exist and are displayed during Open Houses, Major fairs and other promotional events for recruitment.

YouTube: There has been a development of short YouTube videos for the purpose of advertisement and recruitment. The use of social media; Instagram, Facebook, and Cell phone has provided us with multiple ways to connect current and future students to our programs. Below are several You Tubes that are currently available with several more in the works and soon to be published:

1. **Aviation**

https://www.youtube.com/watch?v=aMC6iyWabnw

2. **Electronics Technology Program**

https://www.youtube.com/watch?v=Vr6jOwgeWSU

3. **CNC Program**

https://www.youtube.com/watch?v=Af9Cjqw3NxE

4. **CAD Animation**

https://www.youtube.com/watch?v=AEn0HNGRYHg

5. **3D Printing at BCC**

https://www.youtube.com/watch?v=y6ia_vv-FDU

6. **Drafting & Design and Manufacturing Technologies AAS**

https://www.youtube.com/watch?v=qqVkqR5Y_ag

7. **Welding Technology**

https://www.youtube.com/watch?v=kk8WS3EK16A

All the above are all currently on You Tube and can be found by searching "**Bergen Community College Technology Programs"** (or by clicking on the links below each image). As stated, there are several more videos in progress.

Support Services
[Advisement, assessment, testing, job placement, …]

It is important to our program that The BCC Recruitment Staff be aware of what we have in our facilities and what we do in our department. Seeing and experiencing what we do is essential to being able to promote our program. What we do is very visual and hands on and needs to be seen.
We would also request to have a series of "show and tell" programs scheduled with HS Counselors to promote the facilities, student work and program.

Resources, Budget
[Staffing, operating and capital budgets, grants, …]

There are departmental budgets allocated and replenished at the start of each fiscal year. The IDT department is allotted funds in the following important areas:

- Operating Funds
- Maintenance
- Printing Supplies
- Staffing
- Payroll for Lab-Aides
- Perkins Grant

In the Spring 2018 semester, it was necessary to cut our open lab hours due to budget constraints. Normally, about 40+ hours of open lab time are offered each week during the semester. This allows for student to come on their own time to complete required work using our facilities. This extra time is essential for student success as classroom time is not sufficient for students to complete assignments, projects, etc. to their greatest potential and degree of creativity and design.

Another vital need for our programs is the Maintenance budget. This budget never seems to be enough and quite often machines in disrepair lie dormant until the next budget year when more funds are released and they can be repaired.

The main grant that has helped greatly over the years to add and upgrade equipment is the Perkins Grant.

FOCUS ON COMMUNITY

Reflect on the degree to which you seek regular input from outside of the college—the community—for this program— **please comment on only those which are applicable to this program.**

Community Groups
[High school connections, community agency connections, other forms of community involvement, …]

The IDT Department has several community connections:

The Manufacturing Program has taught classes on campus to the Paramus Applied Tech HS in the Fall 2017 and Spring 2018 semesters. In both semesters, MFG-207 "Machine Tool Principles I" was successfully offered and completed by the HS Sophomores. The "Concepts of Industrial Design" class will be added to the HS curriculum in the Spring 2019 semester.

Architectural Design DFT-266 is the capstone course of the Drafting and Design degree program. It involves the design of a major architectural building over the spring semester. The final student projects are presented at the end of the semester in a charrette format to outside architects and NJIT professors for critique and review. Local architects have been invited to attend the presentation. This has been great exposure for our program and students and has even led to a few job offers and internships.

The Intro to Civil Engineering class visits the NJ League of Municipalities Convention each year in Atlantic City. This allows students to talk to engineering firms and municipalities and experience what is happening in the state relative to the civil, MEP and structural engineering professions. It also offers the students to discuss potential job opportunities.

The Drafting and Design Department has always had a relationship with the Continuing Ed Department, offering CE classes in AutoCAD, Autodesk Architecture and REVIT. We have expanded this relationship to the Workforce Development Program. Working with Roseanne Crisafi, the Certificate in Construction Documents Technologist & Field Specialist Program was developed. As mentioned earlier in this report, Drafting 1, CAD 1 and Materials and Methods of Construction (classes in the Drafting and Design program) are required classes for this certificate. In addition to reaching prospective students in the certificate program, it offers the opportunity to those students to continue in the AAS degree and carry over 9 credits. It should be noted that Drafting 1 and CAD 1 are entry level classes and are pre-requisites for upper level classes in the D&D Program. This gives those students who wish to continue on to the AAS degree the ability to immediately move forward.

Community Issues Related to Program
[Trends, employment trends or projections, transportation, funding]
The need for program-specific advertising to help access interested non-college bound High School graduates, and from business and industry.

External Requirements or Considerations
[Certifications, accreditations, licensures, professional organization status or involvement, …]
The IDT Department participates in college wide assessment activities for accreditation purposes.
Several Courses in Drafting & Design and CAD Continuing Education courses are approved for American Institute of Architects (AIA) for CEU credits.

Currently Proposed for Academic Year 2018-2019:
Drafting & Design: Construction Document Technologist Credential
CAD Certificate: AutoDesk Certification Exam for AutoCAD Software
Manufacturing Technology AAS: National Institute for Metal Working Skills (NIMS)
Several NIMS Credentials available to students for Health & Safety, Bench Work and Machining Level I.

SUMMARY

Program Achievements, Progress Made Since Last Review
[Major achievements, changes, implementations, progress made since the time of the last review]

1. The last program review was in 2005. This review was focused only on the Drafting & Design and CAD Certificate only. In this review, the number one recommendation was the request to hire an additional tenured track faculty member as there was only one (down from a previous three) in 2005. This request was met as Prof. Vince Benanti was hired. He was previously an adjunct/lecturer for almost 20 years. This greatly helped solidify the architectural portion of the program and assure that students were receiving a credible learning experience.

2. In 2008, the BCC administration realigned the College divisions and departments. Our Drafting & Design program was merged with Manufacturing Technology, Electronics Technology, and General Engineering Technology programs and the Industrial & Design Technologies (IDT) department was created. Prof. King, a full time Professor, was appointed as the Department Chair of IDT. (Later, in 2012, the Aviation Technology program was created and added to the IDT department.) In or around 2014, the IDT department was merged into the new Computer Science, Engineering & Information Technologies (CSEIT) department.

   In 2008 Prof. King was appointed Chair of a search committee which hired Prof. Mark Balzarette to a tenure track position to the Manufacturing Technology Program. From 2008-2012, Marzocco, King & Balzarette developed, proposed and received BCC Senate approval for major changes in the curriculum for all the IDT programs, however, the Manufacturing Technology Program had the major changes. Enrollment was very low and the program was in danger of being cancelled. Among several of the programs problems, the largest weakness was the narrow focus of courses relating to two primary skills learned for students: Manual machining on Milling Machine and Lathe. A study was made to identify the types of industries in the tri-county area to determine what would be the best employable skills for graduating students. New courses were added to help diversify and expand the skills to meet the needs of the tri county industries. Prof. Balzarette created four Certificate of Achievement Programs; Machine Tooling, Welding Technology, CNC Programming Technology, and Manufacturing Design using Pro/Engineer Software. In addition to creating the aforementioned courses/COA's, the Manufacturing Technology Labs were in disrepair and contained obsolete equipment. New machines were purchased, (with the help of the Perkins grant), repairs were made, and general classroom improvements were made and are still being made for the best possible student learning experience.

3. The evolution of STEM and its programs, STEM students have benefitted from the improved IDT program curriculum, faculty, and lab equipment.

4. The IDT curriculum continues to be improved with the goal of Student Pathways. Current or incoming HS students from several tri county High Schools can receive some college credits.

Then, once enrolled into the program, students have transfer opportunities to NJIT in both Drafting & Design AAS and Manufacturing Technology AAS. Currently, a Drafting & Design student has up to 21 DFT course credits that are approved as transfer into NJIT the College of Architecture & Design (COAD).

Mission/Goals/Objectives
[To what degree does the program meet its mission, goals and objectives?]

Mission:
The quality of the Drafting & Design program is evident by the many telephone calls from various disciplines of local industry requesting to send them students for employment. In addition to this, it is common for one of our former students, whom was hired, to call us after some time to say they were promoted and now the company requires another student to replace them. This constant successful hiring is encouraging evidence that the Drafting & Design fulfills its mission statement. Similar interactions have been experienced for the other programs within the IDT discipline.

Goals and Objectives:

The structure of the IDT programs, which all have consistent syllabus format and clearly state goals and objectives on the cover page, assures that a student who has fulfilled the requirements of the class and thereby passed the class, has achieved its goals and objectives as described in the syllabus.

Strengths
[Unique characteristics, special capacities, …]

The greatest strength of the Drafting and Design Department is our faculty and staff. Faculty consists of three full time professors and nine adjuncts. Professionally, these twelve professors consist of two registered architects, two licensed engineers, Electrical Engineers, architectural and engineering design office managers, High School Technology teacher, Certified Educator in Technology, Certified AutoCAD instructor and one middle school teacher. This connection to the professions in the field is invaluable when advising students and preparing them for the "real world". There is excellent student contact and communication is the norm - a student can see a professor in their program almost every day of the week.

The two main Drafting classroom/labs used are equipped and set up to use, CISCO Show and Share recording systems as well as a wall and Tech Building monitors which display program specific You-Tube videos.

The equipment used is state of the art. 3D printers, a render farms, color plotters and always the latest versions of programs - the Autodesk programs are updated each year in August to have the most recent versions ready for use starting in the Fall Semester. Not only is this equipment

available during class time but, with the usual 40+ hours a week of open lab time (including Friday nights and Saturdays), 14 hours a day, 6 days a week.

Challenges
[Concerns, difficulties, areas for improvement, …]

1. The IDT programs will develop specialized skills for the students. The challenge for these programs, due to their specialized nature, has been diminishing enrollment in the second level courses. The challenge is to build a stable enrollment so students can progress through the program without courses being cancelled due to low enrollment. A solution to help build enrollment may lie in these areas;
    a. Assistance from BCC Admissions for specific advertising in the community addressing technology interests.
    b. Actively reach out to BCC High school recruitment staff to bring awareness of our programs into the High Schools.
    c. Improve WEB visibility and awareness.
    d. Continued presence at BCC Open Houses, Major Fairs and any event where a recruitment opportunity exists.

2. Manufacturing Technology:
   Currently, the Manufacturing Technology program needs a tenure track or full time Professor. This gap in leadership inhibits program growth. The Manufacturing Technology program also lacks adequate expertise in CNC instruction. This is a major component of Manufacturing and a dedicated Adjunct for this specialized area would bring a greater level of credibility to the Manufacturing staff and help grow its reputation and enrollment growth.

3. Electronics Technology / General Engineering Technology:
   The Capstone courses ELC-214 Communication Systems I and ELC-215 Communication Systems II are under discussion for upgrading to encompass more digital content. This will prepare graduates with a more diverse set of skills to maximize employment potential.

Celebration and Recognition
[Awards, honors, special recognitions, …]

Several IDT students have notable accolades such as an ELC student. Upon completing his Electrical Technology degree, he transferred to NJIT and Graduated Valedictorian. His major was Electrical Engineering.

Recommendations for Change
[Internal to program, external to program, new opportunities, is additional data needed to effectively evaluate this program? …]

IDT needs more visibility on BCC Web site. Our program is currently buried several branches deep. It needs updating, however there is little incentive due to its difficulty in finding. Also, the process of updating and maintaining is difficult.

There is no campus signage to advertise or direct students to any IDT program other than the Technology Building. It is recommended that there be signage outside the Technology Building listing the IDT disciplines. In the Pitkin Building, there needs to be signage directing students to the Electronics Technology Lab.

There are several mentions of other recommendations mentioned throughout this program review.

ACTION PLAN

Program review is a means to an end, not an end in itself. Your final task is to develop a plan to improve the program.

[Identify 2-3 program goals and objectives for the future, improvements planned, changes taking place, responsible parties, timeframes, resource implications, etc.…]

1) Goal: Improve enrollment and create Leadership in Manufacturing Technology Program
   a) Objective: Hire tenure track faculty in Manufacturing Technology
      i) Timeframe: 2018-2019 Academic Year
      ii) Responsible Party(ies): Prof. Matt King, Prof. Vince Benanti, Prof. Emily Vandalovsky (Academic Chair), Dean PJ Ricatto.
      iii) Resource Implications: College must approve a new faculty line.
   b) Objective: Improve expertise in CNC courses by hiring new adjunct.
      i) Timeframe: 2018-2019 Academic year
      ii) Responsible Party(ies): Mark Balzarette, Prof. Matt King, Prof. Emily Vandalovsky (Academic Chair), Dean PJ Ricatto.
      iii) Resource Implications: Adjunct salary
2) Goal: Curriculum Improvements
   a) Objective: Modify the course name and description of DFT-208 Engineering Graphics I, to Engineering Graphics Using Solid Works.
      i) Timeframe: 2018-2019 Academic Year
      ii) Responsible Party(ies): Prof. Matt King, Prof. Emily Vandalovsky (Academic Chair), Dean PJ Ricatto.
      iii) Resource Implications: Curriculum Committee and Senate must approve request. This course will then be eligible for transfer to several 4-year colleges.
   b) Objective: Remove unnecessary pre-requisite to DFT-209 Civil Engineering Methods
      i) Timeframe: 2018-2019 Academic Year
      ii) Responsible Party(ies): Prof. Matt King, Prof. Emily Vandalovsky (Academic Chair), Dean PJ Ricatto.
      iii) Resource Implications: Curriculum Committee and Senate must approve request. Students in the General Engineering Technology are being blocked from enrolling due to unnecessary pre-requisite of Dft-208 Engineering Graphics I which is not in their curriculum.
3) Goal: Program Creation
   a) Objective: Develop One Year Transfer Track with NJIT School of Architecture.
      i) Timeframe: 2018-2019 Academic Year
      ii) Responsible Party(ies): Prof. Vincent Benanti, Prof. Emily Vandalovsky (Academic Chair), Dean PJ Ricatto.
      iii) Resource Implications: Students will be able to transfer 31-32 credits after one year at BCC. NJIT-SOA will be developing a reverse transfer track for completion of AAS Degree at BCC.