

Bergenfield School District

Science, Technology,  
Engineering and Mathematics  
(STEM) Program

Student/Mentor Manual

2024 - 2025

Mrs. Anuradha Thadani  
STEM Adviser  
Bergenfield High School

## INDEX

Contents	Page
<i>Purpose</i> .....	3
<i>Introduction/Goal</i> .....	3
<i>Program Specifics</i> .....	3
<i>Selection Process</i> .....	3
<i>Curriculum Tracks</i> .....	4
<i>Required Coursework</i> .....	4
<i>Research Projects</i> .....	5
<i>Grading/Assessment</i> .....	5
<i>Deliverables and Deadlines</i> .....	5
<i>Special Priority Requirements</i> .....	6
<i>Competition Requirements</i> .....	6
<i>Student Achievements</i> .....	7
<i>STEM Mentor Duties and Responsibilities</i> .....	7
<i>STEM Adviser Duties and Responsibilities</i> .....	8
<i>STEM Director Duties and Responsibilities</i> .....	9
<i>Summary</i> .....	10
<i>Application Process</i> .....	11
<i>Application Form</i> .....	12
<i>Teacher Recommendation Form</i> .....	13
<i>Deliverable Requirements and Deadlines</i> .....	15
<i>Frequently Asked Questions</i> .....	18

Bergenfield School District  
Science, Technology, Engineering and Mathematics (STEM) Program  
Student/Mentor Manual

I. Purpose:

The Bergenfield School District's Science, Technology, Engineering, and Mathematics (STEM) Program Student/Faculty Manual has been designed as a reference guide for students, parents and faculty. This manual outlines and describes the basic guidelines, requirements, deadlines, etc. of the STEM Program.

II. Introduction to STEM:

Today's job market is ever-changing due to our society's increasing dependence on, and expansion of new technology. The majority of employment opportunities are dependent on STEM skills. Education itself is changing in order to keep pace and meet the future needs of our students as STEM skills are being taught across the curriculum at all grade levels. The term "STEM" has become synonymous with the phrase "College and Career Readiness". The parents of our gifted and talented middle school students are well aware of their children's needs and research all the options available for their high school experience.

The Bergenfield STEM Program offers specially designed curriculum tracks for the most promising high school students in our District who are seriously considering a career in the STEM fields. If accepted into the STEM Program, students will be required to maintain a "B" or better average in a set curricula of advanced coursework, work with a mentor over a 4-year period to design, conduct, and present the findings of a primary research project, and participate in at least one related state or national competition.

Students successfully completing this 4-year program will not only receive course credit for completing one of the most rigorous college and career readiness curricula available, they will experience the process of "hands-on" primary research and graduate with "Elite" status.

III. Program Goal:

The primary goal of the STEM Program is to offer an accelerated curriculum track and enrichment program for our gifted and talented students who are considering attending highly competitive colleges and universities and prepare them for successful careers as leaders in their fields of choice. The STEM program will prepare students for the nation's top colleges and universities and eventually, successful integration into advanced positions in today's ever-changing job market.

IV. Program Specifics:

A. Student Selection (Refer to Appendix A):

1. Students must apply for acceptance into STEM.
2. Minimum qualifications for admission into the STEM Program:
  - a. Successful completion of Algebra 1 (A- or better)
  - b. ASK 7 (or equivalent) scores of 230 and above
  - c. Successful panel interview.
3. Enrollment will be limited to 10-15 students per grade level.

B. Curriculum:

1. General:  
It should be noted that all courses are made available to any BHS student and are not limited to STEM participants. However, STEM students will be given priority in ensuring that they are enrolled in required coursework each semester. STEM Students will be provided latitude in designing their complete curriculum around their required courses.
2. Required Coursework :  
STEM skills are required in nearly every aspect of a student's education. The following is a table of specified STEM courses required for the BHS STEM curriculum: (Students MUST maintain a minimum of a B- average in each class.)

YEAR	SCIENCE	MATH	TECHNOLOGY
<b>YEAR 1 (Freshmen)</b>	AP Environmental Science <b>and</b> Honors Chemistry	Algebra II <b>or</b> Geometry Honors	
<b>YEAR 2 (Sophomores)</b>	AP Chemistry <b>and</b> Honors Biology	Algebra II (If student took Geometry Honors in year 1) <b>or</b> Pre-Calculus	AP Computer Science Principles
<b>YEAR 3 (Juniors)</b>	AP Biology <b>and</b> _____ AP Physics 1 or 2 (depending on which is being offered)	AP Calculus AB/BC (If student took pre-calculus in year 2) <b>or</b> Pre-Calculus	

<b>YEAR 4 (Seniors)</b>	AP Physics C <b>or</b> AP Physics 1 or 2 (Depending on which the student took in junior year)  <b>or</b> Any other Science Elective (Physics C, Anatomy, Medical Terminology, Forensics, Marine)	AP Calculus AP/BC  (If student took Pre-calculus in year 3)  <b>or</b> AP Statistics (If student has already taken AP Calculus – if not, students <b>MUST</b> take AP Calculus)	AP Computer Science A
-------------------------	---	---	-----------------------

Possible Electives: AP Language and Composition, AP US History, AP Literature and Composition, AP World History, Marine Biology, Forensics, Medical Terminology, AP Music Theory, AP Government, Robotics 1,2, 3

C. Research Project:

1. General:

To remain in the program, STEM students must work with a mentor over a 4-year period to design, conduct, and present the findings of a primary research project. Students must complete 3.5 hours per week of research, after school with their mentors.

2. Portfolio, Journal, and Work Log (Refer to Appendix B):

- a. Students must maintain an organized portfolio of all research-related work performed throughout his/her experience. This will include any notes, interviews, activities, research studies, etc. as they pertain to the project.
- b. A running journal is also required and will serve to help organize the work.
- c. It is the student's responsibility to document his/her hours of research-related study on an EXCEL spreadsheet.
- d. Mentors will assist students in setting up their individual portfolios, journals, and work log spreadsheets.

3. STEM Marking Period Grading:

- a. Assessed by a mentor-created rubric system, students will receive a pass/fail grade each marking period based on, but not limited to, their portfolio, journal and work log

submissions. Students will be receiving 1.0 credit hour per year through a BHS Independent Project (IP), weighted as an honors course.

- b. Along with on-going formative assessment of student progress, mentors will provide their students with a summative assessment at the end of each marking period.
- c. Probation and Termination:  
Students who are unable to take all STEM specified courses, **or** unable to maintain a B- or higher average in their coursework, **or** are unable to meet the 3.5 hour/week commitment to research with their mentors **or** have disciplinary issues such as cheating, plagiarism, truancy, etc. will be placed on probation. They will receive a probation letter which is to be signed by themselves and their parents. During probation they are expected to use all resources available to them, including extra-help from teachers, peer tutoring, etc. to improve their grades and meet the 3.5 hour requirement. If a student is unable to improve grades or unable to meet STEM requirements after three probation letters, the student will be removed from the program.

4. Deliverables and Deadlines (Refer to Appendix B):

- a. Year 1 - Investigation and Selection of Research Topic:  
Students will work both independently and under the direct supervision of their mentor for a minimum of 3.5 hours per week to investigate and select a primary research question. A summary report (5-10 pages) must be submitted to the mentor by the last week of the 2<sup>nd</sup> marking period. Students will then conduct an extensive literature search of a topic of interest. Students must log all time spent on this effort in order to receive credit for this effort.
- b. Years 2 & 3 - Essay Defense / Project Design & Research:  
Students will prepare and defend a topic-related critical essay (15 – 20 pages) to a committee of STEM mentors during the second marking period of their second year. In the remainder of their second and third year, students will work with their mentor, and possibly, outside experts to

design and conduct a technology-based research project. Students will be encouraged to work with affiliate colleges and/or universities. Students will continue to provide their mentors with on-going reports documenting efforts (minimum 3.5 hrs/week) and research findings in order to receive credit.

c. Year 4 - Presentation of Research Findings:

In their final year, students will work with their mentor to compile their research findings (Thesis: 20 – 30 pages) and present them in a “defense-style” dissertation before a panel of STEM Mentors and outside experts. Work logs must document efforts of no less than 3.5 hours/week.

D. Special Priority Requirements

1. Monthly Priority Day: On the first Tuesday of the month, ALL STEM students will be required to meet as a group (3:05pm – 4:05pm) in room 210. The purpose of these sessions is to ensure that all participants are aware of, and keeping pace with, requirement deadlines.
2. Technology Seminars: All first year STEM Students must attend a minimum of five technology and engineering seminars to be held at FDU’s Teaneck Metropolitan Campus. These sessions are run on Saturday mornings during the spring semester.

E. Competition Requirements:

1. General:

Students will be required to participate in at least one State or National Competition.

2. Options: Students may choose from the following:

- a. Junior Science and Humanities Symposium at Rutgers
- b. STEM C<sup>2</sup> Research Summit at Bergen Community College
- c. Chemistry Olympics
- d. North Jersey Regional Science Fair

V. Student Achievements: While enrolled in the BHS STEM program, current and former student achievements include:

1. Competing at the Northern New Jersey Junior Science and Humanities

Symposium at Rutgers University and winning 1<sup>st</sup> place for “Best Designed Poster”.

2. Being the only high school students to compete with college students at the STEM C<sup>2</sup> Research Summit at Bergen Community College.
3. Winning 1<sup>st</sup> Place Overall at the New Jersey Chemistry Olympics
4. Successfully completing the Technology Enrichment Outreach Program (TEOP) at Fairleigh Dickenson University

VI. Mentor Duties and Responsibilities:

1. General:

Each STEM student will be assigned a mentor whose background most closely reflects the student’s field of interest. The mentor will provide guidance to his/her students over a 4-year period to ensure the effective implementation of course curriculum and quality of the technical research project. Depending on the stage of the project, mentors will typically meet at least weekly with their students, provide on-going guidance, and assess project progress each marking period.

2. Specific:

a. Investigation and Selection of Research Topic:

In their student’s first year, mentors will guide them in selecting and researching a topic of interest. Mentors will monitor students to ensure that they are keeping a running log of all time spent working with their mentor.

b. Design and Conduct a Technology-Based Research Project:

In their student’s second and third years, mentors will first assist them in completing and presenting the critical essay. Afterward, mentors will guide them in designing and conducting their technology-based research project. Mentors will encourage students to work with affiliate colleges and/or universities and work co-operatively with those individuals, if applicable.

c. Presentation of Research Findings:

In their student’s final year, mentors will assist them in compiling their research findings, writing their thesis, and presenting those results in a dissertation before a panel of STEM mentors.

d. Competition Requirements:

Mentors will assist students in preparing for, and participating in, a minimum of one state or national competition.



- e. Research Project Assessment:  
Depending on the stage of the project, mentors will typically meet at least weekly with their students, provide on-going guidance, and assess project progress in the form of an “Independent Study” course grade each marking period.

VII. STEM Adviser Duties and Responsibilities:

1. General:

The primary duty of the STEM Adviser (SA) is the implementation of the District’s Program. He/she will coordinate and oversee the mentor/student activities, monitor the progress of the STEM students and ensure that all requirements of the program are met. The Adviser will directly work with all mentors to assist the students to succeed. He/she will arrange all “outside” activities such as technology seminars, competitions, and field trips and ensure that these activities are adequately chaperoned.

2. Specific:

- a. Implementation of the STEM Program:  
The SA will be responsible for implementing the Program at the classroom level. Implementation will include formulating and working within a program-specific budget.
- b. Assistance in Literature Searches and Primary Research:  
The SA will provide various avenues (mini-classes, guest lecturers, etc.) that will assist mentors in teaching proper literature search and primary research skills.
- c. Monitor Mentor/Student Activities:  
The SA will assist mentors and their students in meeting duties and responsibilities by holding monthly student meetings, periodic mentor PLT meetings as necessary, and provide any other assistance to enhance the STEM experience.
- d. Facilitate Monthly Priority Day Meetings: On the first Tuesday of the month, ALL STEM students and mentors will be required to meet as a group (3:05pm – 4:05pm) in room 210. The purpose of these sessions is to ensure that all participants are aware of, and keeping pace with, requirement deadlines.
- e. Arrange Chaperoning for Technology Seminars: All first year STEM Students must attend a minimum of five technology and engineering seminars to be held at FDU’s Teaneck Metropolitan Campus. These sessions are run on Saturday mornings during the spring semester. The STEM Adviser will chaperone or arrange for chaperones for these events.

- f. Arrange Chaperoning at Competitions: Students will be required to participate in at least one State or National Competition. Students may choose from the following: Student Paper Competition at a Professional Association's Technical Conference, NJ State Envirothon Competition, Chemistry Olympics, or State/National Science Fair Competition. The STEM Adviser will chaperone or arrange for chaperones at these events.

#### VIII. STEM Director Duties and Responsibilities:

##### 1. General:

The primary duty of the STEM Director (SD) is to oversee, monitor, and improve the effectiveness of the District's Program. He/she will oversee the adviser / mentor / student activities, monitor the progress of the STEM mentors and students, and ensure that all requirements of the program are met.

##### 2. Specific:

###### a. Development and Promotion of the STEM Program:

The SD will work with the STEM PLT to improve and enhance the Program. The Director will promote the Program with outside colleges, universities and organizations.

###### b. Assure Proper Program Infrastructure:

The SD will ensure that all equipment, supplies, transportation, field trips, etc. are provided as part of the STEM experience.

###### c. Oversee Program Activities:

The SD will facilitate monthly adviser PLT meetings, individual student/parent meetings as necessary, and provide any other assistance to enhance the STEM experience.

###### d. Assisting the Guidance Department:

The SD will work directly with the Guidance Department in assisting the STEM students to achieve their goals. The SD will also assist students in arranging for "independent research credit" for their primary research projects.

###### e. Outreach:

The SD will continue to explore the possibility of working in association with reputable engineering colleges and/or universities or corporate sponsors and seek out available grant monies to help offset the costs of the program.

#### IX. Summary:

The Program described herein, has been designed and is being implemented to create advanced curriculum tracks for gifted and talented Bergenfield students who are considering challenging careers that demand college and career readiness, or STEM skills. The program outlined is geared to prepare students for the nation's top colleges and eventually, successful integration into today's ever-changing technological job market. In offering this challenging curriculum, the Bergenfield School District strives to establish itself as a forerunner in the field of Gifted and Talented Education by providing advanced Science, Technology, Engineering, and Mathematics skills at the secondary level.

## **Appendix A**

### **The Application Process**

Please complete this application and return it to your guidance counselor or if you are currently attending a private school, please forward your application to Mrs. Anuradha Thadani, STEM Adviser, at Bergenfield High School, 80 S. Prospect Ave., Bergenfield, N.J. 07621 **no later than Friday, February 24th, 2023.** No applications will be accepted after this deadline!

Should you have any questions, please do not hesitate to contact Mrs. Anuradha Thadani at [athadani@bergenfield.org](mailto:athadani@bergenfield.org)

After a review of all applications, applicants still under consideration will be invited to participate in a group interview, which will take place at Roy W. Brown Middle School in **mid March, 2023.**

**Letters of Acceptance** into the Bergenfield School District School Year 2023-2024 STEM Program will be issued **by early April 2023.**

# Bergenfield Public Schools

## SCIENCE, TECHNOLOGY, ENGINEERING, & MATHEMATICS (STEM)

We are very excited that you are interested in the Bergenfield High School STEM Program! Please complete this application and return it to your guidance counselor OR if you are currently attending a private school, please forward your application to Mrs. Anuradha Thadani, STEM Adviser at Bergenfield High School, 80 S. Prospect Ave., Bergenfield, N.J. 07621.

Checklist of items to submit for the STEM application:

- \_\_\_\_\_ Submit completed application form
- \_\_\_\_\_ Personal Statement of future ambitions & why you would be a good candidate for the STEM program
- \_\_\_\_\_ Submit current schedule, marking period grades & ASK/COOP/Other test scores (if applicable)
- \_\_\_\_\_ Submit two letters of recommendation (One letter must be from a Science or Math teacher)

Student Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Gender: M \_\_\_\_\_ F \_\_\_\_\_  
First Middle Last MM/DD/YYYY

Parent/Guardian: \_\_\_\_\_ Parent: \_\_\_\_\_ Guardian: \_\_\_\_\_  
                                     First                    Middle                    Last

Home Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_ Business Phone: \_\_\_\_\_

Address: \_\_\_\_\_  
Number & Street

If you are not currently attending Roy W. Brown Middle School, please complete the following:

<u>Current Schedule:</u>	<u>Most Recent Marking Period Grades:</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____

Number of days absent this year: \_\_\_\_\_ Number of days absent last year: \_\_\_\_\_  
Have you ever been suspended from school? If so, provide details below:

My signature indicates the information above is accurate.

Student signature

---

Parent/Guardian signature and date

## BHS STEM PROGRAM

80 S. Prospect Avenue

Bergenfield, NJ 07621

### Teacher Recommendation Form (Confidential)

*Please return this form to BHS STEM Adviser, Mrs. Anuradha Thadani, or RWB Guidance Counselor.*

#### Student Biographical Information

To be completed by applicant

First Name \_\_\_\_\_ Middle Initial \_\_\_\_\_ Last Name \_\_\_\_\_

Year of Graduation \_\_\_\_\_ Home Email Address \_\_\_\_\_

#### To be completed by current teacher

Your Name \_\_\_\_\_ School \_\_\_\_\_

Academic Subject Taught \_\_\_\_\_ How long have you known the applicant? \_\_\_\_\_

May we call you? \_\_\_\_\_ Phone \_\_\_\_\_ Best Time \_\_\_\_\_

Teachers- Please rank the above student according to his/her merit in each of the following categories. Please circle the number that reflects his/her performance.

10 = Outstanding

5 = Average Amongst Classmates

1 = Limited

#### 1. Current Academic Performance

10    9    8    7    6    5    4    3    2    1

#### 2. Level of Motivation, Effort, and Perseverance

10    9    8    7    6    5    4    3    2    1

#### 3. Study Habits, Organization

10    9    8    7    6    5    4    3    2    1

#### 4. Use of Class Time, Class Conduct

10    9    8    7    6    5    4    3    2    1

#### 5. Critical Thinking Skills

10    9    8    7    6    5    4    3    2    1

#### 6. Leadership

10      9      8      7      6      5      4      3      2      1

**7. Honesty and Integrity**

10      9      8      7      6      5      4      3      2      1

**8. Consideration for Others**

10      9      8      7      6      5      4      3      2      1

**9. Ability to Take Initiative or Work Independently**

10      9      8      7      6      5      4      3      2      1

**10. Ability to Communicate Effectively (Both Written and Verbally)**

10      9      8      7      6      5      4      3      2      1

**Behavior**

Has this applicant ever:

\_\_\_\_\_ been suspended?      \_\_\_\_\_ received frequent detentions?

\_\_\_\_\_ been on behavioral contract?      \_\_\_\_\_ received other disciplinary actions?

**Additional Comments (Optional):**

---

---

---

---

Would you recommend this student for acceptance into the STEM program at BHS? Please keep in mind that **a maximum of 15 students will be accepted each year.**

HIGHEST RECOMMENDATION

DO NOT RECOMMEND

STRONGLY RECOMMEND

UNDECIDED

RECOMMEND

I PREFER NOT TO ANSWER

Signature \_\_\_\_\_ Date \_\_\_\_\_

Title \_\_\_\_\_

# **Appendix B**

## **Deliverable Requirements and Deadlines**

- I. Journal:
  - A. An electronic journal will be kept in a spreadsheet format which will be provided to all participants. The journal will be chronological and, at a minimum, include:
    - 1. Dates of entries
    - 2. Thoughts, ideas and opinions
    - 3. Objective and subjective observations
  - B. The journal will serve as qualitative documentation of progress made and will be assessed each marking period.
  
- II. Portfolio:
  - A. The portfolio requirement will vary depending on the type and scope of the project that the student pursues. Typically, the portfolio should, at a minimum, include:
    - 1. Table of contents
    - 2. Organized collection of project-related documents
  - B. The Portfolio will serve as quantitative documentation of program deliverables and will be assessed each marking period.
  
- III. Work Log:
  - A. An electronic work log (similar to the journal) will be kept in a spreadsheet format which will be provided to all participants. The work log will serve to document all hours dedicated to project-related work and should include:
    - 1. Date
    - 2. Activity
    - 3. Number of hours logged
  - B. The work log will serve as qualitative documentation of hours logged and will be assessed each marking period.
  
- IV. Summary Report (first year students only)
  - A. A summary report (5-10 pages) must be submitted to the mentor by the last week of the 2<sup>nd</sup> marking period.
  - B. The purpose of this report is to make sure that students fully understand the concept of the critical essay. Mentor requirements will vary based on the situation.
  
- V. Essay / Defense Guidelines (2<sup>nd</sup> Year Critical Essay and 4<sup>th</sup> Yr. Thesis)

A. **Writing Guidelines:**

1. Work with your Mentor and English teacher. Your teacher will be happy to assist you as far as proper “writing guidelines”.
2. Follow all BHS English Department guidelines for grammar, punctuation, reference formats, etc.
3. Double space.

B. **Title Page**

Your Title Page should include:

1. Full title of your essay/thesis. The title should be concise but detailed enough to reflect the unique nature of your specific area of interest.
2. Your Name (Do not write “by”)
3. Your Mentor’s Name (Indicate “Mentor”)
4. A statement that this document is “in partial fulfillment of the requirements for the Bergenfield High School Science Technology, Engineering, and Mathematics Program”.
5. Date: Month, Year

C. **Abstract**

1. An abstract is usually a one or two paragraph synopsis of your scientific question (essay) or hypothesis (thesis) your findings, and conclusion.
2. The abstract comes after the title page but is NOT page 1 of your essay/thesis.

D. **Essay / Thesis Structure**

1. **Introduction:**

- a. Scientific critical essays and theses always begin with a detailed description of the question being posed, the validity for seeking answers to that question, and the thought process that led to your inquiry.
- b. You are summarizing the weeks and/or months of thought and initial research that you put into the “starting point” for your literature search or primary research. To adequately address this, your introduction will most likely be 2 to 4 pages (essay) or 3 to 6 pages (thesis). For your thesis, state your hypothesis in the introduction.

2. **Body**



- a. The body of your essay will introduce, explain, and relate all literature pertaining to your question. For the thesis you will support your conclusion.
- b. Findings should be organized so that all related information can be discussed in a smooth, flowing manner, that is easy to follow and supportive of your goal.
- c. All sources of information must be annotated as per the guidelines of the BHS English Department.
- d. Obviously, the length of the body of a critical essay and thesis will vary based on the specificity of the topic. However, most of the topics being investigated should require between 15 to 20 pages (essay) or 20 to 30 pages (thesis).

3. **Conclusion**

- a. Restate your original question. If the original question has been altered based on your findings, state its new form. (For the thesis – restate your hypothesis).
  - b. Unlike the introduction, objectively identify the need to answer your question in the scientific community.
  - c. For the thesis, state your conclusions.
4. Summarize your findings and explain the reasoning behind pursuing your future research.

E. **Submission Deadlines**

1. The final draft of your Critical Essay is due by the last week of the 1<sup>st</sup> marking period in your 2<sup>nd</sup> year. The final draft of your thesis is due by the end of the 3<sup>rd</sup> marking period in your 4<sup>th</sup> year.
2. Arrange with your mentor to submit rough drafts as needed prior to that date to avoid problems.

F. **Defense**

1. You are required to defend your critical essay in your second year and research project in your senior year of the STEM Program.
2. Your mentor will assist you in preparing for your defense. Consider the critical essay defense as a good preparation for your thesis defense as a senior.
3. Basically, on or about the first week in June you will be required to discuss your findings with a panel of no less than 3 BHS faculty members. You are expected to be the “expert” on your topic.

# Appendix C

## Frequently Asked Questions

### ***What is STEM Education?***

Science, technology, engineering and mathematics (STEM) education is a relatively new mode of thinking about how best to educate high school students for the workforce and for post-secondary education.

STEM education is not simply a new name for the traditional approach to teaching science and mathematics nor is it just the grafting of “technology” and “engineering” layers onto standard science and math curricula. STEM education removes the traditional barriers erected between the four disciplines, by integrating the four subjects into one cohesive means of teaching and learning. The engineering component puts emphasis on the process and design of solutions instead of the solutions themselves. This approach allows students to explore math and science in a more personalized context, while helping them to develop the critical thinking skills that can be applied to all facets of their work and academic lives. STEM is the method that students utilize for discovery, exploration, and problem-solving and applies to all aspects of education including the arts and humanities.

The technology component allows for a deeper understanding of the three other parts of STEM education. It allows students to apply what they have learned, utilizing computers with specialized and professional applications like Autodesk Design Academy and computer animation. These and other applications of technology allow students to explore STEM subjects in greater detail and in a practical manner.

### ***Why is STEM Education Important?***

High school education must adapt to the changing needs of America’s economy. All sectors of the workforce – from entry-level jobs to more advanced positions – are requiring workers to have a greater capacity to think critically, work independently, and apply an ever widening set of sophisticated skills. Even entry-level jobs require these sophisticated skills from their “unskilled” workers.

Increasingly more college graduates are opting out of technical fields like engineering and the hard sciences, reducing the supply of potential workers for America’s emerging needs within these fields. As current workers in the engineering and hard science fields reach retirement age, the United States will not be able to fill these positions to keep itself competitive in the international labor market.

STEM education provides an early groundwork for fostering students' interest in these kinds of careers and provides the entry-level skills for the workforce and for post-secondary education.

### ***How Does STEM Education Affect My Organization?***

As STEM education gains footing with our nation's high schools, many facets of teaching and learning will adapt from teacher education and in-service development to upgraded course materials and funding, STEM education affects a wide-range of high school policy and practice.

### ***How much does it cost to take part in the STEM Program?***

The STEM Program is offered free of charge to all participants through the generosity of Bergenfield Board of Education and partnering universities. In addition, STEM students will have laptops (if requested) to conduct their research.

### ***How do we recruit students?***

We are looking for bright, motivated young people who are interested in partaking in one of the most challenging curricula available at the high school level. In the late fall and early winter, we contact the Roy W. Brown Middle School for teacher recommendations for students they think would benefit from our program. We post our application online, so everyone can access our information in time for our deadline.

The STEM Program recruits students, residing in Bergenfield, who are **enrolled** in public or private schools.

The selection committee reviews the applications and notifies the students of their acceptance status by March 15<sup>th</sup>.

The application package must include:

- Two letters of recommendation from Math and Science teachers.
- Middle School Official Transcript.

In addition, students may be required to take a STEM pre-test based on their Science and Mathematics aptitude. Applicants may also need to write an essay as part of the test to demonstrate their ability to communicate ideas and write effectively.

The STEM Program is limited to 20 students per grade level.

***Why is homework assigned during the summer?***

Homework is a requirement for the STEM Program. Part of our goal is to prepare students for academic success in high school, college and beyond. The point of homework is to review concepts introduced in class, identify and address areas that may be unclear or confusing and develop mastery of the content. We believe that developing a habit of producing high quality homework is critical to their long-term success.

***If I get into the STEM Program, do I have a better chance of getting into competitive schools?***

Really, that is up to you. The STEM Program is an excellent place to start, but that's just the beginning. You will have to work hard and make a serious commitment to your learning throughout your high school experience.

***My child will be in the 9<sup>th</sup> grade in September. Can she apply to the STEM Program?***

Yes. The STEM program accepts Bergenfield resident students who will be in 9<sup>th</sup> grade in September 2019.

***Who will teach my child?***

The STEM Program is staffed by six mentors who possess a mastery of the technical disciplines, knowledge of cutting edge developments in science and technology, and a love of teaching.

***What if my child doesn't want to participate in some of the activities?***

The STEM Program is a competitive and comprehensive program. Participants are expected to take part in the **full** complement of required activities.

***What resources are available for parents?***

We believe that parents are children's first teachers. The STEM Program works closely with parents throughout the year to ensure that participants are receiving the academic enrichment they need.

To cultivate those relationships, we host Parent Seminars, collaborate with families, offer Bergenfield High School Open House, and discuss STEM progress at Parent-Teacher Conferences.

***Can my child opt out of the STEM Program?***

Yes. STEM is a voluntary program. Students must fulfill the STEM requirements in order to stay in the program. A student wishing to opt out of the Program is asked to submit a letter, signed by a parent or guardian stating his/her intentions.

***Which schools are STEM students currently enrolled?***

All of our STEM graduates to date are in top Universities and Colleges studying in fields including, but not limited to, engineering, pharmacy, biochemistry, environmental science, and business.

## Appendix D

# **STEM FACULTY**

Anuradha Thadani  
Adviser (STEM Adviser)

Edward Steen  
Mentor (Mathematics)

Rofe Baello  
Mentor (Chemistry/Environmental)

Anuradha Thadani  
Mentor/STEM Advisor (Biology/Forensics)

Lorena Ruiz  
Mentor (Biology)

### **TEAMING COLLEGES**

Fairleigh Dickinson (Metropolitan Campus)

Ramapo College (Mahwah)

Bergen Community College (Paramus)

Rutgers University (New Brunswick)