

# The Polymath Degree Program

## Philosophy/Mission

*If Leonardo da Vinci were alive today, where would he go to college?*

The Polymath Institute is founded on the principle that all knowledge is interconnected, and it is precisely those connections between subjects that yield innovation and discovery. When we embrace both breadth and depth of knowledge, we gain wisdom and understanding leading to insights that can literally change the world.

Our vision is to train and teach passionate people, instill in them a greater awareness and appreciation of the vast interconnectedness of the universe, and harness their knowledge for the purpose of bettering themselves, their relationships, and their stewardship of our communities, our environment, and our world.

We serve students at the university undergraduate and graduate levels. Our aim is to provide students with a more integrative, broader knowledge base as well as greater experience and practical application in their chosen subject fields. We intend to achieve our vision through our unique degree program that focuses on professional applications and assessments.

*One da Vinci changed the world. What could thousands do?*

## Structure

Degrees at the Polymath Institute are organized in a unique and innovative fashion that is very different from traditional education. Our degree program consists of several metrics, in descending order of importance:

1. [Professional Applications](#): Concrete, marketable projects with world-changing, world-bettering intent that are planned, designed, and executed by students. These projects replace traditional academic majors as the organizational core of students' curriculum, directing their learning activities within and across traditional disciplines and ensuring they have a strong practical resume upon graduation.
2. [Experience](#): Applications of projects in research, in industry, or on campus. May include performances, publication of literary works, entrepreneurship, volunteering, scholarly research, or other practical applications designed to expose students to the practices and regulations of their professions.
3. [Assessments](#): Question banks designed to test deep conceptual knowledge of learned material over short- and long-term periods.

In support of these requirements, there are 4 learning resources made available to students:

1. [Lectures](#): Pre-recorded and live lectures by field experts, made available in classrooms, through the internet, in the library, and by other means.
2. [Discussions](#): Informal, live learning sessions where teachers and students give and receive practical, hands-on guidance with subject-specific material.
3. [Libraries](#): Lectures, Textbooks and other static learning resources are made available through the Institute's library system.
4. [Mentorship](#): One-on-one meetings with faculty mentors intended to guide students through academic, personal, and professional development. These meetings focus on student development; mentors do not oversee, assign, or grade any of the students' work.

## Professional Applications

Professional Applications are concrete projects that serve as the organizational core of the Polymath Degree Program. Lectures, Discussions, Libraries, Research, Industry Experiences, and Mentorship are among the many supporting resources available to help the students successfully complete the projects that they are pursuing. The successful completion of these projects serves as the primary demonstration that students have achieved competence in their areas of study. Professional Applications allow graduates to attain a strong practical resume in conjunction with an academic degree.

The Professional Applications are not intended to be academic exercises. These projects tangibly express our core value of harnessing knowledge for the betterment of ourselves, our relationships, and our stewardship of our communities, our environment, and our world. Depending on a particular student's chosen field of study, a Professional Application might consist of publishing a novel, creating a technology startup company, or restoring a historical architectural landmark.

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### Example:

A student at the Polymath Institute is studying the overlapping fields of ecology, mechanical engineering, and landscape architecture and is collaborating with other students and corporate partners on his Professional Applications project of designing and developing a distributed system for water treatment utilizing bio-filters and bioreactors. This student assumes responsibility for some specific research and design, and he will also publish a paper in a technical journal, prototype and test the device, apply for a patent, create a business plan, present the idea to venture capitalists, set up a manufacturing facility, and ultimately create an entire startup company to implement his own idea in the world.

Not only do our students earn a degree from the Polymath Institute, they also demonstrate competence in their fields through real-world experience. Whether starting his own corporation or interviewing for an Environmental Engineering job at a company like 3M, such a student graduates with more than a degree: he can point to the wide range of skills he has developed through executing a concrete project that is useful to his employer and community. These skills may include patent writing, development of test methods, and design for manufacturability, all of which are vital skills that are typically neglected in a traditional university's ecology degree program.

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Professional Applications are designed in collaboration between students, faculty advisors, and corporate partners. Students are ultimately responsible for the selection and direction of their own projects. A student could pursue one large-scale project or a number of smaller related projects, working collaboratively or individually, depending on the nature of the subjects being studied.

Requirements include successful completion of project goals (including subject-specific, experience, and personal development competencies) and English literacy competency as described above. Milestones are developed by students and faculty advisors and may be modified over time as necessary through their agreement. Though it is our goal to make every project a success beyond each student's education, not all ventures will be commercially successful, and some may be frustrated by elements outside of the student's control. "Success" at the Polymath Institute is defined as demonstrating skills in learning, planning, execution, and follow-through. Mastery of one or more subjects at the university level will naturally occur as a by-product of a successful Professional Applications project. Ultimate determination of a project's success lies with faculty.

Subject-specific competencies are measured through topic and cumulative assessments. Experience-related competencies can include the project itself (i.e. publishing a book) as well as activities such as internships, research publications, senior projects, and volunteer positions. Personal development competencies refer to specific life skills, interpersonal skills, and emotional growth; students work with mentors to choose at least ten specific skills to develop, and during the final year of their studies at Polymath, they will complete a writing project discussing how they have grown throughout the program in those specific skills.

Though this is not a strict requirement, Practical Applications should be designed to require approximately 3,000 hours of student work, which is equivalent to about 1 year of full-time work. Logging hours is required and will help faculty advisors guide students through their projects and ensure appropriate progress is being made.

It is highly encouraged for projects to be collaborative efforts between students, however this is not a requirement for projects that are more solitary in nature. It is almost certain, however, that students will use each other, faculty, and organizations

outside the Polymath Institute as resources for their projects.

### **English Language and Literacy Mastery**

Because all graduates of accredited universities are required to demonstrate oral and written mastery of the English language at the university level, Polymath students must complete several writing and speech assignments. These assignments can be based around the students' Professional Applications projects.

Before beginning their chosen projects for Professional Applications, students will complete a "Tell us about your vision" essay that describes their project, motivations for choosing it, and where they aim for the project to lead (future goals, business ideas, etc). Students will then present their project ideas to faculty for approval. Students' essays and presentations must both show collegiate-level writing and speaking skills..

Additionally, students will be required to complete a writing project of their choosing (i.e. a senior project thesis, scientific journal article, fiction or non-fiction novella) that also demonstrates such mastery.

#### Graduation Requirements:

Completion of project goals as determined by student and faculty advisor. English Language and Literacy Mastery. Subject-specific (typically in multiple subject areas) competencies, experience competencies, and personal development competencies as part of the Professional Applications program.

### **Assessments**

Professional Applications demonstrate student competence in applying the knowledge they have gained while earning their degree(s) from Polymath Institute. Assessments, however, are the tools Polymath Institute uses to certify that students have achieved a deep conceptual understanding of their chosen fields of study. Together, these two components of the Polymath Degree Program create a powerful statement of a graduating student's abilities. Assessments test cognitive knowledge but do not necessarily guarantee competence in applying the material outside of the classroom. Professional Applications are the true demonstration of the ability to apply knowledge.

Assessments consist of question sets designed to test conceptual understanding of topic material, and come in two forms:

#### 1. Topic Assessments

Topic Assessments correspond to individual topics on a one-to-one basis and cover material presented in Lectures, textbooks, and other learning resources. Credits are not granted for a topic until the Topic Assessment is passed. These assessments can be scheduled by the student at any time, and students can retake any Topic Assessment that was not passed initially. Each Topic Assessment is worth 1 Topic Assessment Credit. 4,500 Topic Assessment Credits are required to graduate.

## 2. Cumulative Assessments

In addition to Topic Assessments, questions are also periodically pooled into Cumulative Assessments to ensure that students have adequately internalized topic material and are not simply relying on short-term recall to pass Topic Assessments. Questions from all Topic Assessments currently passed are pooled and randomly presented to students.

Cumulative Assessments occur at regular intervals throughout the students' education at Polymath Institute. These intervals will be agreed upon by students and faculty advisors, taking into account the individual student's preferred pace. Each single Cumulative Assessment is worth 1 Cumulative Assessment Credit. 100 Cumulative Assessment Credits are required to graduate.

Compare these requirements to a full-time student enrolled at a traditional college:

- Full-time is defined as 16 credits per semester.
- Each 4-credit class is roughly 3 hours of lecture per week.
- The year is broken into 2 semesters of 16 weeks each.
- There are thus 384 lecture-hours per year, and 1536 for a 4-year degree.
- Polymath Institute topics are roughly 20-minute units.
- This means a curriculum of 4,500 topics is equivalent to a traditional university degree.

Assessments are not graded on a traditional A-F scale, but rather tested to a statistically-defined proficiency level. Questions continue to be presented to the student until a pre-set performance level is achieved (i.e. 95% correct answers out of 20 questions). Because assessments are essentially pass/fail, traditional grades are unnecessary. No student earns credit for an Assessment until their understanding of the material is "A" equivalent.

Assessments are closed-book, computer-based exams administered by the Polymath Institute's testing facility. Complete data saved from each assessment is available to the student and faculty in order to help identify students' scholastic strengths and weaknesses and to address them appropriately. Statistics may also be used to facilitate self-reflective analysis for students but are not used to assign traditional grades.

## Graduation Requirements:

4,500 Assessment Credits

## 100 Cumulative Assessment Credits

### **Lectures**

In the traditional education paradigm, lectures are the primary method of information transmission from teachers to students. This idea comes from antiquity when literacy rates were low, and the spoken word was the only practical method of teaching. The Polymath Degree Program does not eliminate the lecture component of education, but reorients it and balances it with the other components.

Lectures at the Polymath Institute are not organized around 16-week semester courses as is typical in traditional universities. Instead, each Lecture corresponds to a single topic (about 20 minutes) which allows students more flexibility and customization when selecting their subjects of study. For example, instead of a 16-week course on differential calculus, a Lecture at the Polymath Institute may cover only a single topic, such as the product rule. A related collection of Lectures would be equivalent to a single traditional college class.

Lectures are ultimately simply tools for learning, and their use is ultimately at the discretion of the student. However, students are responsible for learning the material presented, measured by Assessments and ultimately through their Professional Applications. Since learning types differ, each student will have the freedom to emphasize his or her own style, favoring lectures, discussion, printed textbooks, or other methods as is appropriate for the student as an individual.

All Lectures are recorded and made available to students through the library, internet, and other means. This allows students to work through Lectures at their own pace and does not constrain students with limited lecture times as in traditional universities.

Lectures are learning resources for students to use at their own discretion and are not themselves a graduation requirement. However, Lectures correspond to Topic Assessments on a one-to-one basis, so lecture material must be learned (through a Lecture or other means) before credits will be awarded for the corresponding Topic Assessment.

### **Discussions**

Discussions are another learning resource made available to students. They are the primary way face-to-face student/teacher interactions take place in the Polymath Degree Program. Because lectures are pre-recorded and can be used by the students at any time and at their own pace, teacher time is not dominated by lecturing the same material year after year to large groups of students. Instead, teacher time can primarily be spent answering student questions, explaining difficult material in more

detail, and working through practical examples relevant to the topic.

Discussions are regularly scheduled in the full range subjects offered by the Polymath Institute. Discussions do not correspond to Lectures or Topic Assessments on a one-to-one basis, but are organized around broader subject areas more comparable to traditional university subjects. For example, a differential calculus Discussion may include topics from which many Lectures are practiced.

## **Libraries**

The Polymath Institute Library System is another learning resource for students. The library provides access to recorded lectures, textbooks, academic journals and other reference material. The library is intended to replace the need for student bookstores, reducing the financial burden on the students, as well as providing a quiet, comfortable place for students to think and study. However, students are allowed and encouraged to purchase their own copies of library materials if they prefer to do so.

## **Mentorship**

The mentorship component of the Polymath Degree Program is designed to benefit each individual student as well as the Polymath community as a whole. For each student, mentorship facilitates academic, professional, and personal development; for the community, mentorship fosters stewardship of the university, the community worldwide, and our environment. The goal of the Polymath Institute is not only to educate students in academic pursuits or even practical skills, but also to train self-actualized and successful human beings. This expands our mission beyond the academic portion of our students' lives and encourages development of our core values in each student: Creativity, Leadership, Innovation, Service, Compassion, Truth, and Independence.

Upon starting their education at the Polymath Institute, students interview with and are paired with mentors. Unlike graduate program advisors, these mentors do not play a supervisory role in the student's academic work or projects; their first duty is to the personal development and success of the student. These pairings may be adjusted to better suit student needs at later times in their Polymath education.. Students also meet weekly with advisors for encouragement toward more and greater academic successes, personal development, greater self-awareness, leadership, and expression. Examples of mentorship activities may include exploring psychological tools like the Myers-Briggs Type Indicator, practical tools like time management and studying techniques, or strategies for conflict resolution.

## **Graduation Requirements Summary**

1. Completion of project goals determined by student and advisor
2. 4,500 Topic Assessment Credits
3. 100 Cumulative Assessment Credits
4. Approval of the Polymath Institute's Academic Advisory Board



## Appendix A: Sample Schedule

The Polymath Degree Program is designed to be an equivalent time commitment to a traditional 4-year undergraduate degree. However, the Polymath Degree Program is more flexible, can proceed at an individual student's own pace, and incorporates practical field experience.

The following schedule is an example of the case where a student wishes to complete the program in 4 years:

Year 1			Year 2		
Semester 1 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>	Semester 1 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>
	lecture hours	12		lecture hours	12
	discussion hours	8		discussion hours	6
	studying hours	8		studying hours	6
	assessment hours	4		assessment hours	3
	mentoring hours	3		mentoring hours	3
	project hours	0		project hours	4
	total hours per week	35		total hours per week	34
2 week vacation			2 week vacation		
Semester 2 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>	Semester 2 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>
	lecture hours	12		lecture hours	12
	discussion hours	8		discussion hours	6
	studying hours	8		studying hours	6
	assessment hours	4		assessment hours	3
	mentoring hours	3		mentoring hours	2
	project hours	0		project hours	8
	total hours per week	35		total hours per week	37
2-week Vacation			2-week Vacation		
Year 3			Year 4		
Semester 1 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>	Semester 1 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>
	lecture hours	6		lecture hours	2
	discussion hours	2		discussion hours	1
	studying hours	4		studying hours	1
	assessment hours	1		assessment hours	0
	mentoring hours	2		mentoring hours	1
	project hours	24		project hours	32
	total hours per week	39		total hours per week	37
2-week Vacation			2-week Vacation		
Semester 2 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>	Semester 2 (24 weeks)	<b>Degree Program Tasks</b>	<b>Hours/ week</b>

	lecture hours	6			lecture hours	1
	discussion hours	2			discussion hours	1
	studying hours	4			studying hours	1
	assessment hours	1			assessment hours	0
	mentoring hours	2			mentoring hours	1
	project hours	24			project hours	32
	total hours per week	39			total hours per week	36
2-week Vacation				2-week Vacation		