**Purpose**: This tool is a collection of templates that faculty and administrators can use to prepare for and implement multidisciplinary discussions focused on *identifying a default mathematics course requirement that is most relevant for each program of study*.

**Audience:** This tool is intended for use with a small group that includes mathematics faculty, partner discipline faculty, and related department leadership.

**The tool contains the following parts:**

* Meeting Preparation Advice
* Meeting Agenda Template
* Mathematics Department Discussion Template
* Discipline Team Discussion Template
* Survey of Mathematical Skills
* Sample Timeline and Activities

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| **Meeting Preparation Advice** |
| ***Establish roles.**** Meeting lead: This person can be someone from either the mathematics department or the departmental team and is responsible for organizing logistics and facilitating agenda.
* Math lead: The math lead should have familiarity with the learning outcomes for all entry-level math courses and is responsible for bringing appropriate resources to the discussion.
* Discipline team: The discipline team should be prepared to discuss the quantitative skills students in your programs need and the way in which mathematics is used in jobs in your field.
* Others?

***Complete preparation as outlined in the appropriate discussion template.**** Review either the Mathematics Department Discussion Template or the Discipline Team Discussion Template.
* Jot down initial thinking and/or bring available documentation to the discussion.
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|  **Meeting Agenda Template** |
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| *5 minutes* | ***Set the charge.*** |  |
|  | *Identify shared goal*: * Work toward identifying a default mathematics course requirement that is most relevant for each program of study.

*Outcome for this specific meeting*: * Develop a shared understanding of the needs for mathematics in the program(s) of study as well as topics covered in the mathematics courses.

*Establish group norms*: * Recognize that everyone has expertise.
* Honor requests for additional thinking time so everyone can participate.
* Use specific examples and agree on definitions.
* Presume positive intentions.
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| *10 minutes* | ***Develop common understanding of the context.*** |
|  | * Share relevant student success data for mathematics pathways.
* Identify the specific programs of study that will be part of this discussion.
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| *30 – 40 minutes* | ***Develop common understanding mathematical needs for these specific program(s) of study.*** |
|  | * See questions listed in the *Mathematics Department Discussion Template* and the *Discipline Team Discussion Template*.
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| *5 – 10 minutes* | ***Plan future action.*** |
|  | *Reflect on the discussion.** What progress has been made toward identifying a default mathematics course?
* What additional information is needed to make progress on this decision?

*Identify next steps.** Administrative support: What additional supports do you need to move this forward at your institution?
* Communication: Who needs to be updated about this discussion? Who should be involved in future discussions?
* Responsibility: Who is responsible for organizing future discussions?
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| **Mathematics Department Discussion Template** |
| **Preparation**: Consider bringing the following resources to the meeting. * Relevant student success data for mathematics pathways.
* Examples of the mathematics problems students will encounter in each course.
* Illustration of the ways you incorporate the partner discipline into the existing mathematics courses.
* Program of Study briefs, recommendations of professional associations, meta-major frameworks, etc.
* MAA’s partner discipline reports: MAA (2004). [*The Curriculum Foundations Project Voices of the Partner Disciplines*;](http://www.maa.org/sites/default/files/pdf/CUPM/crafty/curriculum-foundations.pdf) and MAA (2011). [*Partner Discipline Recommendations for Introductory College Mathematics and the Implications for College Algebra*](https://www.maa.org/sites/default/files/pdf/CUPM/crafty/introreport.pdf).
* Arkansas’s Math Task Force Report: [*Forging Relevant Mathematics Pathways in Arkansas*](https://dcmathpathways.org/sites/default/files/resources/2018-01/Forging%20Relevant%20Mathematics%20Pathways%20in%20Arkansas%5B1%5D.pdf)

**Discussion:** Develop a shared **understanding** **of the needs** for mathematics in the program of study as well as the **topics covered in the mathematics courses**. Guiding questions include:* Are students expected to use mathematics in this program of study?
* What math skills do partner disciplines assume are currently being taught in the mathematics courses?
* What is the responsibility of our institution to mathematically prepare students for 1) academic, 2) career, and 3) civic responsibilities?
* Do students in this program wait until their last year to complete their math requirement?
* Do students in this program fail to progress towards graduation because of math?
* What quantitative learning outcomes are identified as necessary by national professional associations in this field?
* What opportunities are there for applying this discipline’s models and problems in the default entry-level math course?

**Notes:** |

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| **Discipline Team Discussion Template**  |
| **Preparation:** Describe what your **students need to be quantitatively prepared** for your department’s programs of study. * What are the mathematical skills used in careers/jobs that students in your discipline go on to pursue?
* What are the mathematical skills and abilities that students need to learn in entry-level mathematics courses to prepare for upper-division coursework in your discipline? *The next section, Survey of Mathematical Skills, may be useful here.*
* What applications of mathematics do students use most frequently in your discipline?
* Do some of your students display “math anxiety” – delay course taking, avoid quantitative assignments, have fixed mindset about math ability, etc.? How can you partner with the math department to address these concerns?
* How do you think your discipline’s models and problems could be included in entry-level math courses?
* Are there any programs of study in this discipline that have mathematics requirements not shared by other programs in this discipline?
* Which of the following best describes how the certificates or degrees in your program connect to future credentials?
	+ Our credentials are terminal. After our programs, there are no additional certifications or degrees at other institutions.
	+ Our credentials could lead to additional credentials at other institutions.

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| **Survey of Mathematical Skills**  |
| Which of the following best describe the skills your students need to develop? Try to limit your select to (at most) five.* Summarize and interpret data.
* Graph a large variety of algebraic functions.
* Apply logic and reasoning to solve problems.
* Model the real world, especially financial problems, using algebra.
* Model the real world using probability.
* Apply common probability distributions, such as normal and binomial.
* Apply the theory of functions.
* Reason using ratio and proportions.
* Use functions to model real-world phenomena.
* Evaluate all roots of higher degree polynomial and rational functions.
* Create and interpret graphical/tabular representations of data.
* Draw conclusions based on data.
* Apply solution methods for a large variety of algebraic equations.
* Apply right triangle trigonometry.
* Determine the validity of an argument or statement and provide mathematical evidence.
* Recognize, solve and apply systems of linear equations using matrices.
* No significant mathematical preparation is required.
* Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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| **Meeting Preparation Advice** |  |
| Month 1 – Secure mandate from president/provost to achieve the goal. Send communication to deans and department chairs describing the work. Develop survey instrument. |  |
| Month 2 – Have deans and department chairs select a single faculty point of contact. Communicate with all points of contact about expectations and answer any questions about the survey and student learning outcomes.  |  |
| Month 3 – Points of contact solicit input from departments during a faculty meeting. Points of contact submit surveys. |  |
| Month 4 – Math leads analyze survey and author a report that includes findings and recommendations. |  |
| Month 5 – Math leads meet with points of contact to finalize decision on default course requirements.  |  |
| Month 6 – Communicate with all stakeholders about recommendations. |  |
| Month 7 – Plan meetings with transfer institutions to align programs requirements. Consider connecting partner disciplines from across institutions to address misalignment of math requirements.  |  |
| Month 8 (and beyond) – Update degree plans, advising documents, and course catalogs with new information. |  |