MASTER OF SCIENCE TEACHING DEGREE HANDBOOK

(see http://mst.rice.edu/ for details and annual updates)

Summary of the MST Program:

A content-based, non-thesis, advanced degree primarily directed towards inservice middle school, IPC (Integrated Physics and Chemistry), Physics, or Astronomy high school teachers and other Education and Public Outreach (EPO) professionals. Thirty credit hours required, of which at least 15 will be content or combination content/tools courses. The remaining credits can either be content, tools, education, research, or practicum, with no more than 12 hours total in research and practicum credits. A special project is required as part of the research or practicum hours. Each student will have a 3-person committee, with at least two members from the tenure-track faculty, to approve the student's proposed program, advising which specific courses will best suit the student's needs, and approving their final project. At least one of the members of the committee will be an experienced Education Professional, who will ensure the appropriateness of the courses to the educator's program. At least one person of the committee will be an expert in the content area that is the student's primary teaching interest. The usual other MS requirements will apply; for example, no more than 9 hours as a Class III student, no more than 6 hours transfer credit, and at least 30 hours at the 500 level and above. The students apply through the Physics and Astronomy Department; GREs are not required. A 3-person committee with at least one Education Professional will review applications.

Program Learning Outcomes:

The program has the following learning objectives, which are each student will master *(and the courses where each can be satisfied, given in parenthesis)*:

1. Solve Problems based on Kepler's Laws and Newton's Laws using non-calculus mathematical techniques (**ASTR 502**, **ASTR 503**)
2. Demonstrate best practices for teaching scientific content. (**ASTR 502**; **ASTR 503**; **ASTR 503**)
3. Present an oral report on a scientific topic by using Powerpoint. (**ASTR 502**, **ASTR 503**, **PHYS 501**)
4. Learn how to use scientific and astronomical equipment such as telescopes, digital cameras, GPS, electronic devices including multimeters, and/or portable planetariums. (**ASTR 530**, **PHYS 501**)
5. Prepare a Final Project, which will include scientific research, educational research, and/or curriculum creation or analysis. (Final project - **PHYS 800** or research hours from a different department)

Application Information:

Application Deadlines Oct 1 for January admission; December 15 for Fall admission

Prospective students should apply through the Physics and Astronomy Department, and applications can be submitted online.

Three letters of recommendation are required (be sure that your letter-writer includes a paragraph and doesn't simply fill out the numerical scores). Be sure to specify the M.S.T. program (deadlines and requirements may be different from the normal research-based graduate program), and specify which content focus you desire (e.g. middle school science, High school Astronomy or Earth and Space Science, informal education, IPC, etc.). Preference is given to teachers who have previously taken one or more courses or workshops at Rice University.

E-mail inquiries about the Physics and Astronomy graduate program at Rice should be directed to the Physics and Astronomy Department's Graduate Admissions Coordinator.
Telephone: (713) 348-6348 Email: physgrad@rice.edu

Direct correspondence to: MST Admissions Committee, Physics and Astronomy Department, Mail-Stop 61, Rice University, 6100 Main Street, Houston, TX 77005-1892

https://physics.rice.edu/how-apply

Students in the Program:

Orientation Activities:

Students should attend Orientation week activities if at all possible. Special forms need to be filled out. If they cannot attend, they need to coordinate with the P&A Graduate Coordinator as soon as possible.

MST students must apply for a "@rice.edu" email address. If they choose to use their own email accounts, be sure to SET UP the rice.edu account to forward to your preferred email account. Often mail comes with fast deadlines so be sure that the P&A department and Dr. Reiff have the email address you read daily. A second authorizing channel is also needed (e.g. phone DUO account).

Each student will get an "Esther" account that is critical for registration, petitions, payments etc.

Courses Available: http://mst.rice.edu/courses.html

Four courses are offered through the Physics and Astronomy Department:

1. ASTR 502: Teaching Earth and Space Science
   https://mst.rice.edu/ASTR502/

2. ASTR 503: Astronomy for Teachers
   https://mst.rice.edu/ASTR503/

3. ASTR 530: Teaching Astronomy Laboratory
   https://mst.rice.edu/ASTR530/

4. PHYS 501: Physics of Ham Radio
   https://mst.rice.edu/PHYS501/

and one special course:
5. PHYS 800: Research (also can be used for Teaching Practicum) (can be repeated for credit). **NOTE:** when registering for PHYS800, **be sure to specify the number of desired hours**; it automatically defaults to only one hour.

Rice offers a special discounted teacher tuition rate for MST teachers – at present, only $1200 plus fees for each 3-hour class. A few partial tuition scholarships are available. These classes are also generally open to Rice undergraduate non-majors. The Physics and Astronomy courses follow a four-semester sequence. Other special Rice courses for teachers in other departments may also be applied to the degree, with the approval of the student's committee. Other 500 or higher level courses in Natural Science, Math, Chemistry, Computer Science, Engineering, etc. may count towards the degree and will vary; contact Dr. Reiff for permission to use other courses in the MST degree program. Note: at the moment there are no Earth Science course offerings. We hope these will be resumed in the future.

Registration:

Students must preregister for coursework and/ or teaching and/or research for the upcoming semester (via Esther), **well before the end of the previous semester**. Dr. Reiff will submit the summary tuition form so that the student will not be billed the default tuition rate, but she and Rosa need to know your registration choices well in advance. Contact her for the best courses you should take that semester well in advance. Otherwise there will be a late registration fee. **You must sign up for at least 3 hours each semester** or request a “leave of absence” for that semester.

Payments:

Tuition and fees must be paid in a timely manner or registrations, etc will be locked. Note the Registrar and the Cashier CLOSE EARLY. You may need to use a professional development day from time to time to come on campus to deal with various issues.

Graduation Procedures for MST Students:

When an MST student is anticipating graduation, this is what needs to be done:

1) Student should check with the P&A Graduate Coordinator early in the student's last academic year to ensure that all transfer credits have been approved and all requirements will be met.
2) For transfer of coursework, even courses taken at Rice as a "visiting" student (including the teachers' courses paid for by an outside agency), the student needs to fill out the Request for Transfer Credit: http://registrar.rice.edu/online_forms/, (see "Graduate Students" section). For credit from Rice, a copy of the transcript printed from Esther or WebApps is fine; an official transcript is not needed. If the course was not paid for by an outside agency, such as a NASA grant or their school, the student will be required to repay the tuition at the going rate BEFORE the courses are transferred into their MST program. For credit from another institution, a similar course at Rice must be found and the relevant instructor signs the transfer credit form. A maximum of 9 hours credit as a visiting student and 6 hours credit from another institution is permitted. Log into Esther and check the "degree works" to see if your graduation requirements are met – if not, work with Dr. Reiff to submit the required petitions.
3) Certification for Non-Thesis Masters. Advisor (Dr. Reiff) fills out the form online in "Degree Works" with the student and makes sure he/she has met all the course requirements before he/she approves the degree. Once the adviser gives the seal of approval, the form is submitted to the Graduate Coordinator who in turn will make a copy for the student's file and sends it to the Office of Graduate Studies.
4) Once it is approved by Graduate Studies, the Graduate Coordinator gets the notification.
5) It is not necessary for a MST student to register for the fall if he/she completes all coursework and his/her final project by the end of the first week of classes. If the project is not turned in to the adviser, it would be necessary for the student to register for the fall and pay tuition.
6) Current transcript must be submitted to Graduate Studies with the petition no later than end of February of graduation year (date varies slightly by year).
7) If the student has coursework in progress during the semester s/he plans to graduate, the form needs to be submitted by that semester's deadline to do so, indicating the courses in progress and/or a note attached to the form stating that successful competition of a project in progress is also required. The deadline for submitting for spring conferrals is near the end of February annually (check the "Academic Calendar" for the exact deadlines each year http://registrar.rice.edu/calendars/ .

Capstone Projects: Each MST student must submit a project report to their committee. It can be a research project *or* a curriculum project.

Project deadlines:

1. An Abstract and Outline of project MUST be approved by Dr. Reiff BEFORE the request for graduation submission deadline (late February)
2. A complete (but not necessarily final) version needs to be submitted to the student's committee by April 10. (3 copies, written, in binder, with electronic copies of materials to Reiff and adviser if different).
3. Final version of project must be turned in by May 1 for spring graduation, again including a final electronic verson.
4. Students that do not complete their projects will not graduate on time and will lose any payments made for your diploma.

Project format: (Please put in nice binder with nice looking cover page. The committee will review it, and we need to keep a nice copy. Your committee must review and sign the cover page.

1. Cover page with "project title", "A Project submitted in partial completion for the Degree of Master of Science Teaching; Department of Physics and Astronomy, Rice University, then Your Name, Date, and the name of your advisor
2. Abstract of your project
3. Acknowledgments (including grant support if any)
4. Table of Contents
5. Body of Project (research report, or curriculum report)
6. Conclusions
7. References and Web Links
8. Appendix (attachments): e.g., web pages or activities if developed. Include a printout PLUS include an electronic versions of all materials. If you jointly wrote a research paper, put a copy of it in the attachments plus also in the electronic versions.

A word document with a project template can be found in
https://mst.rice.edu/resources/MST_Project_template.doc

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