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| Department | Math | College | Science |
| Course Rubric & Number | Math 2085 | Date | October 11, 2021 |

**FORM C**

**ADMINISTRATIVE**

**USE ONLY**

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| --- | --- | --- | --- |
|  | UACM |  | UPRE |
|  | UREL |  | RP |
|  | CAT |  | NOLIJ |

Effective: \_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Present Course Description | | | | | | | | | | | | |
| Title | Linear Algebra | | | | | | | | | | | |
| Semester Hours of Credit | | | | | | 3 | | | | | | |
| If combination course type, # hrs. of **credit** for | | | | Lecture: \_\_\_ | | | | | | | **Lab**/Sem/Rec: \_\_\_ | |
| Repeat Credit Max. (if repeatable): | | | | |  | | | | | | | |
| Graduate Credit? | | | | | | Yes | | | No X\_ | |
| Credit will not be given for this course and: | | | | | | | | | Math 2090 | | | |
| **Contact** Hours Per Week: (Indicate hours in appropriate course type.) | | | | | | | | | | | | |
| Lecture  3 | | Lab | Seminar | | | | Recitation  \_\_\_\_\_ | | | Intern | Res/Ind | Clin/Pract |
| Total Weekly Contact Hours: | | | | | | | |  | | | | |
| Grading System: | | | | Letter Grade \_X\_ | | | | | | | Pass/Fail | |
| Course Description:  (Include course number, title, etc. exactly as it appears in the *General Catalog*) MATH 2085 Linear Algebra (3) Prereq.: ~~MATH 1552 or MATH 1553.~~ Credit will not be given for both this course and MATH 2090. Systems of linear equations, vector spaces, linear transformations, matrices, determinants. | | | | | | | | | | | | |

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| Proposed Course Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Title | Linear Algebra | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Short Title | | | | L | I | | N | | E | A | R | | |  | A | | L | | G | E | | | B | R | A |  | |  |  |  |  |
| Semester Hours of Credit | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If combination course type, # hrs. of credit for | | | | Lecture: \_3\_ | | | | | | | | | | | | | | | | | **Lab**/Sem/Rec: \_\_\_ | | | | | | | | | | | |
| Repeat Credit Max. (if repeatable): | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Graduate Credit? | | | | | | Yes \_\_ | | | | | | No X\_ | | | | | |
| Credit will not be given for this course and: | | | | | | | | | | | | Math 2090 | | | | | | | | | | | | | | | | | | | | |
| **Contact** Hours Per Week: (Indicate hours in appropriate course type.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lecture  3 | | Lab | Seminar | | | | | Recitation \_\_\_\_\_ | | | | | | | | Intern | | | | | | Res/Ind | | | | | Clin/Pract | | | | | |
| Total Weekly Contact Hours: | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| Grading System: | | | | | | Letter Grade X | | | | | | | | | | | | | | | | Pass/Fail | | | | | | | | | | |
| Course Description:  (Include course number, title, etc. exactly as it appears in the *General Catalog*) MATH 2085 Linear Algebra (3) Prereq.: *Math 1431, or credit or registration in* MATH 1530, MATH 1550, or MATH 1551. Credit will not be given for both this course and MATH 2090. Systems of linear equations, vector spaces, linear transformations, matrices, determinants. growth models. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**THESE QUESTIONS MUST BE ANSWERED COMPLETELY AND ACCURATELY OR PROPOSAL WILL BE RETURNED.**

Has this change been discussed with and approved by all departments/colleges affected? **Yes** **X\_  No****N/A \_\_\_\_\_**

Is this course included in any curricula, concentrations, or minors? **Yes \_X\_ No**If yes, please list on a separate sheet.

Is this course a prerequisite or corequisite for other courses? **Yes \_X\_ No**If yes, list courses; use separate sheet.

Is this course on the General Education list? **Yes \_\_\_\_ No** **X**

**JUSTIFICATION/EXPLANATION:** Use separate sheet.

**Note:** IF COURSE IS OR WILL BE CROSS-LISTED, SEPARATE FORMS MUST BE SUBMITTED BY EACH DEPARTMENT.

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| --- | --- | --- | --- |
| Approvals | | | |
| Department Faculty Approval Date | 10-21-2021 | College Faculty Approval Date |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_10-21-2021 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Department Chair Signature (date) College Dean Signature (date)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graduate Dean Signature (date) Chair, FS C&C Committee (date)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

College Contact E-mail Academic Affairs Approval (date)

**Instructions for Form C · Request for Changing a Course**

**A SAMPLE SYLLABUS IS REQUIRED FOR ANY OF THE FOLLOWING:**

* A change in credit hours
* A change in the distribution of hours (combination course type)
* Any substantial change to the course description

NOTE: Form C is not to be used for changes in course rubric or numbering. When the number/rubric of a course is being changed, Form A *and* Form B must be submitted to add the course with the new number/rubric and to drop the course with the original number/rubric.

**One original copy of each request must be submitted.**

All questions must be answered. The course proposal will be delayed until the form is filled out completely and correctly. Proposals should be submitted early enough to obtain final approval before the desired effective date.

**Dates** of departmental and college approval of the proposal must be recorded. The Faculty Senate Courses and Curricula Committee will not consider curricular proposals that have not been approved by college/departmental curriculum committees. Please provide the **college/division/departmental contact’s name and email address**, in case of further questions/concerns that may be related to the proposal.

Most items are self-explanatory. The complete present and proposed catalog entries must be provided. Proposed **course descriptions** should follow standard catalog format (See Appendix C for a key to catalog abbreviations and standard catalog wording). Although there is no specific word limit, course descriptions should be concise.

The **short title** appears on transcripts and in the scheduling booklet. It may not exceed 19 characters.

For group courses (lecture, lab, seminar, recitation) **contact hours** refer to the number of hours spent each week with faculty in a classroom or lab setting. For lecture, seminar, and recitation courses, contact hours are generally equal to semester credit hours. For laboratory courses, two or more laboratory contact hours are required to yield a single laboratory credit hour. For individual courses (such as research/ independent study, clinical practicum, or internships) contact hours are less well defined, as these courses may involve minimal contact with faculty in classroom settings. For these courses, contact hours are generally set to equal the maximum number of credit hours permitted for the course.

Departments with curricula that include this course and/or courses for which this course is a prerequisite or corequisite must be identified and notified in writing. Any responses from colleges/departments affected by the proposal should be attached to form C. **If changes to this course affect any curricula, concentrations or minors, separate proposals to change any affected areas must also be submitted before this proposal will be presented to the Faculty Senate Courses and Curricula Committee.**

If the course is on the general education list, the Faculty Senate General Education Committee must also be notified by the department.

If the course is cross-listed, catalog descriptions for both departments and approval signatures of each dean and chair concerned should be submitted

**Statement of the proposed change to the Math 2085 prereq**

The proposal is to change:

“Prereq.: MATH 1552 or MATH 1553*”* to:

“Prereq.: Math 1431, or credit or registration in MATH 1530, MATH 1550, or MATH 1551.”

In layman’s terms, we are reducing the Math 2085 prereq from “Calc II” to credit or registration in “Calc I.”

We are not changing the content of Math 2085.

**Justification for the proposed change to the Math 2085 prereq**

Math 2085 is mainly about vector spaces and linear transformations between vector spaces. Calculus is mentioned in Math 2085 in two ways:

1. Math 2085 give certain examples of vector spaces and linear transformations that are based on calculus. Specifically, the set of continuous real-valued functions on [*a*,*b*], the set of integrable functions on [*a*,*b*], and the set of differentiable (or *n*-times differentiable) functions on (*a*,*b*), are calculus-based examples of vector spaces. And the mapping that takes *f* to *f’*, or the mapping that takes *f* to the integral of *f* over [*a*,*b*], are calculus-based examples of linear transformations between appropriate vector spaces of functions *f*. All such calculus ideas are covered in Calc I; there is no need for Calc II here (though a student with a knowledge of Calc II could understand the additional example of the set of “analytic” functions on (*a*,*b*), which is also a vector space).

2. LSU’s version of Calculus II (Math 1552/1553) introduces vectors in 2 and 3 dimensions, and dot-products, cross-products, and orthogonal projections of such vectors. (In most other schools in the U.S., vectors are not covered until Calc III.) Admittedly, this experience with 2- and 3-dimensional vectors from Math 1552/1553 makes students more comfortable when learning those topics in the more abstract setting of Math 2085.

In principle, Math 2085 could be taught without any mention of these calculus-based examples of vector spaces, and instead be taught mentioning only algebra-based examples of vector spaces, such as the vector space of ordered pairs (or ordered *n*-tuples) of real numbers, or the set of solutions to a system of homogeneous linear equations in several variables. Thus, as far as mathematical content goes, even Calc I is unnecessary as a prereq for Math 2085, which treats only those properties that are common to all vector spaces uniformly.

The other reason for requiring calculus before (or during) Math 2085 is that Calc I leads to a certain level of “mathematical maturity” in the student that is helpful when taking Math 2085. That level is high enough for Math 2085.

Finally, biology majors and certain business majors can benefit from Math 2085, but biology and business majors usually take only Calc I, not Calc II. So this proposed reduction in the Math 2085 prereq will make the course accessible to students in such majors.

**Courses, Curricula, Colleges, Offices, Concentrations, and Minors that mention Math 2085**

College of Agriculture (EXST 4142).  
College of Business (Economics B.A.).  
College of Engineering (CSC 4512, ENGR 3100; Robotics Engineering Minor).

College of Science (Chemical Physics Concentration; Math Minor; Math Major;

Math 2090, 3903, 4023, 4024, 4025, 4027, 4031, 4045, 4058, 4064, 4066, 4153, 4171, 4172, 4181, 4200, 4325,

4340, 4345, 4700, 7320, 7410.

Online Distance Learning (Continuing Ed).

**Approvals of affected units:**

Subject: Requesting approval to relax Math 2085 prereq.  
Date: Thu, 14 Oct 2021 23:43:23 -0500  
From: Charles Delzell <delzell@math.lsu.edu>  
To: D. Allen Rutherford <exst@lsu.edu>,

Charles H. Roussel <crouss5@lsu.edu>,

Richard G. Stahl <abyssean@lsu.edu>,

Craig Harvey <coeasscdean@lsu.edu>,

Marcio de Queiroz <mdeque1@lsu.edu>,

Patti Aymond <paymond@lsu.edu>,

Rachel D'Arensbourg <rdarens@lsu.edu>,

Sasha Thackaberry <thackaberry@lsu.edu>  
CC: Oliver Dasbach <kasten@math.lsu.edu>, Erin Doherty <edoherty1@lsu.edu>  
  
Dear Drs. D. Allen Rutherford (EXST),  
Charles H. Roussel and Richard G. Stahl (ECON),  
Craig Harvey (Engineering),  
Marcio de Queiroz (Robotics Minor),  
Patti Aymond (CSC),  
Rachel D'Arensbourg (Chemistry), and  
Sasha Thackaberry (Online Distance Learning),  
  
I attach a Form C for Math 2085, proposing to change:  
"Prereq.: MATH 1552 or MATH 1553" to:  
"Prereq.: Math 1431, or credit or registration  
in MATH 1530, MATH 1550, or MATH 1551."  
  
The last page of the Form C explains the rationale for this change.  
  
Each of your departments (EXST, ECON, Engineering,  
Robotics Minor, CSC, Chemistry, and Online Distance Learning)  
has some course or curriculum that mentions Math 2085.  
Would you please confirm that this change to Math 2085 is acceptable?  
Alternatively, I would be pleased to discuss any  
concerns that you might have about this proposal.  
  
Thanks in advance.  
  
Sincerely,  
  
Charles Delzell  
Associate Chair for Instruction  
Department of Math  
301A Lockett Hall  
225-578-1619 (LSU)  
225-439-3952 (cell)  
Zoom Personal Meeting ttps://lsu.zoom.us/j/640-175-3712

Subject: Re: Requesting approval to relax Math 2085 prereq.  
Date: Fri, 15 Oct 2021 11:13:40 +0000  
From: Richard G Stahl <abyssean@lsu.edu>  
To: Charles Delzell <delzell@math.lsu.edu>  
CC: Charles H Roussel <crouss5@lsu.edu>, Faik A Koray <eokora@lsu.edu>  
  
Charles,  
  
The Economics Department has no problem with these proposed changes.  
  
Take care.  
  
  
Dr. Richard Stahl  
Marjory B. Ourso Center for Excellence in Teaching Professor  
Director of Undergraduate Studies  
Senior Instructor  
Department of Economics  
Louisiana State University  
2308 Business Education Complex  
Baton Rouge, LA 70803  
Phone: (225) 578-3211

Subject: RE: Requesting approval to relax Math 2085 prereq.  
Date: Fri, 15 Oct 2021 13:11:07 +0000  
From: Donald Beale <dbeale@lsu.edu>  
To: Charles Delzell <delzell@math.lsu.edu>  
  
Chip,  
  
Yes, the proposed change to the MATH 2058 prereq is acceptable to ODL. We approve.  
  
Thank you.  
  
Donald  
  
Donald Beale  
Director, Online Distance Learning  
Online & Continuing Education  
Louisiana State University 323A LETC 340 E. Parker Boulevard, Baton Rouge, LA  70803 office 225-578-3154 lsu.edu | online.lsu.edu

Subject: RE: Requesting approval to relax Math 2085 prereq.  
Date: Mon, 18 Oct 2021 20:58:04 +0000  
From: Patti Aymond <paymond@lsu.edu>  
To: Charles Delzell <delzell@math.lsu.edu>  
  
Chip,  
  
Thanks for the clarification. I've contacted the faculty that teaches CSC 4512, and he said that the prerequisite change for Math 2085 would be fine for the class.   
Patti  
  
Patti Iles Aymond, PhD  
Instructor/Undergraduate Coordinator and Advisor  
Division of Computer Science and Engineering  
Louisiana State University   
3270A Patrick F Taylor Hall, Baton Rouge, LA  70803   
office (225) 578-4359 paymond@lsu.edu | lsu.edu | http://csc.lsu.edu/~paymond/

Subject: Re: Requesting approval to relax Math 2085 prereq.  
Date: Mon, 18 Oct 2021 13:16:29 +0000  
From: Rendy G Kartika <rkartika@lsu.edu>  
To: Charles N Delzell <mmdelz@lsu.edu>  
CC: John A Pojman <japojman@lsu.edu>, Rachel M D'Arensbourg <rdarens@lsu.edu>  
  
Dear Charles,  
  
Chemistry is fine with the proposed change for CHEM 2085 prerequisite.  
  
Cheers,  
-Rendy  
  
Rendy G. Kartika, Ph.D.  
Associate Professor  
Director of Undergraduate Studies  
Department of Chemistry  
Louisiana State University  
337 Chemistry & Materials Building  
Baton Rouge, LA 70803  
office 225-578-5086 I fax 225-578-3458  
rkartika@lsu.edu <mailto:rkartika@lsu.edu> I lsu.edu <http://lsu.edu> I chemistry.lsu.edu <http://chemistry.lsu.edu>

Subject: RE: Requesting approval to relax Math 2085 prereq.  
Date: Mon, 18 Oct 2021 14:30:57 +0000  
From: Marcio de Queiroz <mdeque1@lsu.edu>  
To: LSU CoE Associate Dean <coeasscdean@lsu.edu>, Charles Delzell <delzell@math.lsu.edu>  
  
Yes, the proposed change is acceptable.  
  
Best,  
  
LSU <http://www.lsu.edu/>  
  
\*Marcio de Queiroz, PhD, ASME Fellow\*  
Roy O. Martin Lumber Company Professor  
  
Director, Innovation in Control and Robotics Engineering (iCORE) Lab  
  
Coordinator, Robotics Engineering Minor  
  
Department of Mechanical and Industrial Engineering  
Louisiana State University  
  
Baton Rouge, LA 70803 USA  
  
Office: 3250C PFT Hall | iCORE: 2254 PFT Hall  
225-578-8770  
mdeque1@lsu.edu <mailto:mdeque1@lsu.edu>| lsu.edu <http://www.lsu.edu/>| Bio Sketch <http://www.lsu.edu/eng/mie/people/faculty/dequeiroz.php> | iCORE <https://nam04.safelinks.protection.outlook.com/?url=http%3A%2F%2Ficorelab.github.io%2F&data=04%7C01%7Cmdeque1%40lsu.edu%7Cfdf4fb7764374d9a3fdb08d98d9b434b%7C2d4dad3f50ae47d983a09ae2b1f466f8%7C0%7C0%7C637696520242473771%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=hVTPPVeqtcrAVL83Zif00R67%2BTgV4tH5ta%2FpmZES6Ac%3D&reserved=0>