Final approval has been given to the academic matters reviewed at the March 9, 2021 meeting of the Learning Council as follows:

1. Policy revision – “Readmission to the College” policy found on page 14 of AY20/21 catalog.
   a. Effective Date: FA 2021
   b. Reduce the number of semesters allowed between acceptance and enrollment from four to two.
   c. Revised policy (as it will appear in catalog):

      **Readmission to the College**
      Students who have previously attended QCC and have not attended the College for two consecutive semesters, either due to withdrawal or academic failure, must apply to be readmitted. Students must submit a new application.

      Upon academic failure, or withdrawing from a health or high demand program, students are required to meet with their Program Coordinator to establish guidelines for readmission. Students will be considered only once for readmission to all health programs. Specific steps for readmission can be obtained in the QCC Admissions Office or from the appropriate academic department.

2. New certificate – Dental Assisting Certificate, Weekend Option (DAWA)
   a. Effective Date: FA 2022

3. Course revision – MAT 233 Calculus I
   a. Effective Date: Immediately
   b. Change course description Per DHE recommendation that Early Trancendentals should occur in Calculus I to make the transfer process smoother between QCC and 4 year colleges and universities within the transfer compact.
   c. Course description (as it will appear in catalog):

      **MAT 233 Calculus I**
      This course begins with a review of functions and functional notation. After introducing the limit and continuity theorems on an intuitive basis, the study of differentiation begins. Typical derivative formulae are applied to polynomial, rational, trigonometric, implicit, logarithmic, exponential, and inverse trigonometric functions. Application topics include extrema, related rates, curve sketching, and velocity and acceleration. The basic rules of integration and the
substitution method are introduced along with Riemann Sums and the Fundamental Theorem of Calculus.
Credits: 4
Semester Offered: F/S/SU
Prerequisites: MAT 124 or appropriate placement score

4. Course revision – MAT 234 Calculus II
   a. Effective Date: Immediately
   b. Change course description following BHE recommendations to build a statewide transfer pathway in mathematics.
   c. Course description (as it will appear in catalog):
      **MAT 234 Calculus II**
      This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be reviewed. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L’Hôpital’s Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.
      Credits: 4
      Semester Offered: F/S/SU
      Prerequisites: MAT 233
Recommended Change in Policy for Readmission to the College

The current policy is:
The current statement for readmission is found in our academic catalog on page 14 (https://www.qcc.edu/files/Registration/2020-2021-catalog.pdf) and reads as follows:

Readmission to the College

Students who have previously attended QCC and have not attended the College for four consecutive semesters, either due to withdrawal or academic failure, must apply to be readmitted. Students must submit a new application.

Upon academic failure, or withdrawing from a health or high demand program, students are required to meet with their Program Coordinator to establish guidelines for readmission. Students will be considered only once for readmission to all health programs. Specific steps for readmission can be obtained in the QCC Admissions Office or from the appropriate academic department.

The proposed change is:
Reduce the number of semesters allowed between acceptance and enrollment from four to two.

Justification:
Basically a student could have been accepted for Fall 2019 under the 2019 catalog and not actually enroll until Spring 2021 and still come in under the 2019 catalog. The change is proposing that we move this to two consecutive semesters. I believe this would be beneficial for Academic Affairs so that as curriculum changes we do not have old catalog years on the books. We would not require a new application if the student wanted to enroll in the same major they had previously been accepted to. So in the same example if a student was accepted into CJ FA19 did not enroll FA19 or SP20 they would lose their major. If in FA20 they decided they wanted to enroll in CJ they would fill out an abbreviated form and they could be accepted into CJ for the catalog year 2020. In the new system the process would be an automated workflow that based on logic would streamline the ‘remittance’ and not place a burden on the Admissions staff or create a barrier for enrollment to the student. This policy doesn’t currently apply to healthcare or “highly competitive” programs.

Respectfully submitted,

James M. Keane
Vice President of Academic Affairs
NEW DEGREE PROGRAM, OPTION OR CERTIFICATE PROPOSAL

1. New Degree, Option, or Certificate Name: Dental Assisting Certificate - Weekend Option (DAWO)

2. Originator: Jennifer McKeon  Date: 1/4/2021

3. School Dean: Pat Schmohl  Date: 1/4/2021

4. Effective Date: Fall 2022

5. Reviewed by Program and Process (if applicable)  Date: 1/4/2021

6. Recommended by the School of Health Care  Date: 2/18/2021
   Comments:

7. AA Leadership Team: _______________________________  Date: _________________
   Recommended: ________  Not Recommended: ________
   Comments:______________

8. VP/Academic Affairs: _________________________________  Date: _________________
   Recommended: ________  Not Recommended: ________
   Comments:______________

9. Learning Council: _________________________________  Date: _________________
   Recommended: ________  Not Recommended: ________
   Comments:______________

10. VP/Academic Affairs: _________________________________  Date: _________________
    Approved:__________  Not Approved:__________
    Comments:__________


FOR NEW PROGRAM/OPTION/CERTIFICATE

President: ___________________________  Date: ______________
Approved: ________  Not Approved: ________

Board of Trustees: ___________________________  Date: ______________
Approved: ________  Not Approved: ________
## NEW DEGREE, OPTION, OR CERTIFICATE PROPOSAL

<table>
<thead>
<tr>
<th>Program or Department where this degree, degree option or certificate will be housed: Dental Assisting</th>
</tr>
</thead>
<tbody>
<tr>
<td>School: Health Care</td>
</tr>
<tr>
<td>Degree, Degree option, or Certificate name as it will appear in the college catalog: Dental Assisting Certificate – Weekend Option (DAWO)</td>
</tr>
<tr>
<td>CIP code for the degree, degree option, or certificate (check with IRAP Office): 51.0601</td>
</tr>
<tr>
<td>Attachments: Proposed Academic Map (including milestones)</td>
</tr>
</tbody>
</table>

Submit separate proposals for any new courses or revised courses in the program. Please list here the new courses or revised courses for which separate proposals will be submitted.

No new courses

### List the program goals.

The QCC Dental Assisting Certificate program includes the following program goals:

- To provide a Dental Assisting curriculum that is high quality, student centered, accessible and affordable to obtain entry-level employment as an integral member of the dental health team within six months of graduation, or enroll in an advanced education program.
- To competently and ethically perform chairside dental assisting and related office and laboratory procedures under the direction and supervision of the dentist within the guidelines of the Massachusetts Dental Practice Act and the Dental Profession.
- To demonstrate the appropriate level of knowledge needed to perform dental assisting functions by successfully challenging the Dental Assisting National Board Certified Dental Assistant examination.
- Conduct ongoing review of program goals and curriculum to ensure that the program continues to meet the needs of external organizations, the dental community, and students.
- To provide students with skills to communicate professionally with patients, and to be competent to communicate professionally, along with the skills to collaborate effectively with employers and other health care professionals.
- To engage in intellectual and professional growth, and appreciate the need for life-long learning activities to meet the changing needs and demands of the profession and the community by maintaining a Massachusetts Dental Assisting License, CDA status, and actively participating in the local and/or national level of the American Dental Assisting Association.

### Provide a rationale for the proposed new program including a narrative for each of the following:

- **How the need for this new degree, degree option, or certificate was determined**
  - Dental Advisory Board, Student Demand, Employer input, Coordinator input

- **How the program was designed**
  - To maximize the new dental materials lab on the weekend. We have discussed increasing the number of students in the dental assisting program.

- **How the new degree or certificate was reviewed, approved, or developed through a QCC APR process and/or in conjunction with an advisory board or other external agency**
  - Greys Data was reviewed. A self-study document was completed for a site visit in the fall 2020 (rescheduled to fall 2021). Dental Advisory Board has asked for more dental assisting students.
• If a program goal is employment upon completion, please comment on job titles, demonstrated regional employer interest in hiring graduates, and wage analysis (consult with IRaP office)
  o Greys Data was reviewed. Employers in Worcester County have been calling for our graduates.
• If a program goal is transfer upon completion, please consult with the Coordinator of Transfer Affairs and Articulation and provide a plan for transfer/articulations with baccalaureate institutions

Does any aspect of this proposal affect another department? Please confer with the coordinators of affected departments.
Affected department(s): Dental Hygiene and the noncredit dental assisting radiography program. They all use the shared space.

For an associate degree, does it meet the general education credit requirement for MassTransfer?
If no, please provide a rationale.

Please note that Financial Aid qualification will need to be determined before the new degree, degree option or certificate can be published.

Will any of the following be required:
Additional staff ___  Additional space _X__ Additional equipment ____ Additional library resources ___

This certificate option will use the dental clinic and dental materials lab on the weekend days.
Provide a rationale for any needs indicated and include approximate cost of equipment.

List the PROGRAM STUDENT LEARNING OUTCOMES in the table below. Indicate the course or courses that will fulfill each outcome and indicate the degree or level of connection between the course and outcome as indicated here.

I – Introductory/Background – There is an indirect relationship between the course and the outcome. The outcome itself is not the focus of the course but at least one element of the course serves as a building block to the achievement of the final outcome. For example, course elements may provide the knowledge, skills or attitudes necessary for the ultimate achievement of the outcome.
M – Intermediate/Transitional - There is more of a direct relationship between the course and the outcome than Introductory. A mixture of course elements supports the final achievement of the outcome, but the final integration of knowledge, skills and attitudes necessary for its achievement is not accomplished in this course. For example, knowledge, skills and/or attitudes (at least 2 of the 3) required for achievement of the outcome may be the focus of the course or course element, but the integration of all three is not.
E – Emphasized – There is a direct relationship between the course and the outcome. At least one element of the course focuses specifically on the complex integration of knowledge, skills and attitudes necessary to perform the outcome.

<table>
<thead>
<tr>
<th>PROGRAM STUDENT LEARNING OUTCOMES</th>
<th>Supporting course(s)</th>
<th>I, M, E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Apply CDC, HIPAA, OSHA guidelines to their everyday use in a dental setting( community or private)</td>
<td>DAS 101, DAS 102, DAS 105, DAS 151, DAS 155</td>
<td>I, E, M, E</td>
</tr>
<tr>
<td>2 Uphold professionalism, ethics, and integrity while providing daily</td>
<td>DAS 151</td>
<td>I, M</td>
</tr>
<tr>
<td>PROGRAM STUDENT LEARNING OUTCOMES</td>
<td>Supporting course(s)</td>
<td>I, M, E</td>
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<tr>
<td>----------------------------------</td>
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<tr>
<td>1. Tasks as a dental assisting.</td>
<td>DAS 101 I</td>
<td></td>
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<tr>
<td></td>
<td>DAS 153 E</td>
<td></td>
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<tr>
<td></td>
<td>DAS 105 E</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DAS 155 E</td>
<td></td>
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<tr>
<td>3. Explain any dental procedure or material in layman’s terms to a patient or professional nomenclature to the healthcare community.</td>
<td>DAS 101 I, M E,M M</td>
<td></td>
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<tr>
<td></td>
<td>DAS 151 I, M M E</td>
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<tr>
<td></td>
<td>DAS 153 I, M M E</td>
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<td></td>
<td>DAS 111 I, M M</td>
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<td></td>
<td>DAS 105 I, M M E</td>
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<td></td>
<td>DAS 155 I, M M E</td>
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<td></td>
<td>DASY 131 I, M M E</td>
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<td></td>
<td>DASY 241 I, M M E</td>
<td></td>
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<tr>
<td>4. Attend local or national meetings of ADAA.</td>
<td>DA 151 I, M M E</td>
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<td></td>
<td>DA 155 I, M M E</td>
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<tr>
<td>5. Apply knowledge of the Mass State Delegable duties for a Dental Assisting.</td>
<td>DAS 101 I, M I,M M</td>
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<td></td>
<td>DAS 151 I, M I,M M</td>
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<td></td>
<td>DAS 153 I, M M E</td>
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<td></td>
<td>DAS 155 I, M M E</td>
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<td></td>
<td>DAS 105 I, M M E</td>
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<td></td>
<td>DASY 131 I, M M E</td>
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<td></td>
<td>DASY 241 I, M M E</td>
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<tr>
<td>6. Demonstrate all modalities of dental assisting.</td>
<td>DAS 101 I, M I,M M</td>
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<td>DAS 151 I, M I,M M</td>
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<td>DAS 153 I, M M E</td>
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<td>DAS 105 I, M M E</td>
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<td>DAS 155 I, M M E</td>
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<td>DASY 131 I, M M E</td>
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<td>DASY 241 I, M M E</td>
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<tr>
<td>7. To be competent in the use of technology as a learning resource and for information management.</td>
<td>DAS 151 I, M I,M M</td>
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<td></td>
<td>DAS 101 I, M I,M M</td>
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<td>DAS 102 I, M M E</td>
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<td>DAS 153 I, M M E</td>
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<td>DAS 111 I, M M E</td>
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<td>DAS 105 I, M M E</td>
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<td>DAS 155 I, M M E</td>
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<td></td>
<td>DASY 125 I, M M E</td>
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<td></td>
<td>DASY 131 I, M M E</td>
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<tr>
<td></td>
<td>DASY 241 I, M M E</td>
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</tbody>
</table>
1. Course Number and Name (current) : MAT 233 Calculus I

2. Originator: Math Department Date: 2/25/2021

3. School Dean: Dr. Benjamin Benton Date: 03/03/2021

4. Effective Date: Immediately

5. Reviewed by Program and Process (if applicable) Date:

6. Recommended by the School of Math and Science Date: ________________

   Comments:

7. AA Leadership Team: ____________________________ Date: ________________

   Recommended: _______ Not Recommended: _______

   Comments:

8. VP/Academic Affairs: ____________________________ Date: ________________

   Recommended: _______ Not Recommended: _______

   Comments:

9. Learning Council: ____________________________ Date: ________________

   Recommended: _______ Not Recommended: _______

   Comments:

10. VP/Academic Affairs: ____________________________ Date: ________________

    Approved: _______ Not Approved: _______

    Comments:
<table>
<thead>
<tr>
<th>Type of Revision:</th>
<th>Description</th>
<th>Prerequisite</th>
<th>Corequisite</th>
<th>Number</th>
<th>Name</th>
<th>#credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Description</td>
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<tr>
<td>___ Elective Type</td>
<td>___ other (explain)</td>
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</tbody>
</table>

**Course Discipline or Department:** Mathematics  
**School:** Math and Science

**Current Course Number:** MAT 233  
**Current Course Name:** Calculus I

**Current Course Description (as it appears in the college catalog including course three letter designation and number, title, credits, semesters offered and prerequisites/corequisites):**

**MAT 233 Calculus I**

This course begins with a review of functions and functional notation. After introducing the limit and continuity theorems on an intuitive basis, the study of differentiation begins. Typical derivative formulae are applied to polynomial, rational, trigonometric, and implicit functions. Application topics include extrema, related rates, curve sketching, and velocity and acceleration. The basic rules of integration and the substitution method are introduced along with Riemann Sums and the Fundamental Theorem of Calculus.

Credits: 4  
Semester Offered: F/S/SU  
Prerequisites: MAT 124 or appropriate placement score

**Proposed Description (include all proposed changes):**

**MAT 233 Calculus I**

This course begins with a review of functions and functional notation. After introducing the limit and continuity theorems on an intuitive basis, the study of differentiation begins. Typical derivative formulae are applied to polynomial, rational, trigonometric, implicit, logarithmic, exponential, and inverse trigonometric functions. Application topics include extrema, related rates, curve sketching, and velocity and acceleration. The basic rules of integration and the substitution method are introduced along with Riemann Sums and the Fundamental Theorem of Calculus.

Credits: 4  
Semester Offered: F/S/SU  
Prerequisites: MAT 124 or appropriate placement score

**Rationale for the change:**

Per DHE recommendation Early Trancendentals should occur in Calculus I to make the transfer process smoother between QCC and 4 year colleges and universities within the transfer compact.
Provide a description of any change in course content.

We would add the following Learning Outcomes and Instructional Objectives:

- Define inverse, exponential, logarithmic, and inverse trigonometric functions.
- Differentiate logarithmic and exponential functions.
- Correctly apply logarithmic differentiation.
- Differentiate inverse trigonometric functions.
- Differentiate inverse functions in general.
- Calculate limits using L'Hôpital’s rule.
- Use basic integration rules to find antiderivatives (power rule, trigonometric functions, exponential, logarithmic, inverse trigonometric functions).

List the programs that are affected by this change (list program names and program codes as they appear in the college catalog):

- Computer Science Transfer - CS - Associate in Science (CS)
- Engineering – ERG - Associate in Science
- Engineering – Biomedical Engineering Option – ERBM - Associate in Science
- General Studies - Pre-Pharmacy Option - GSPH- Associate in Arts
- Liberal Arts – Biology Option – LABI – Associate in Arts
- Liberal Arts - Chemistry Option – LACH - Associate in Arts
- Liberal Arts – Environmental Science Option – LAES – Associate in Arts
- Engineering - Pre- engineering and Engineering Technology Certificate – PET
- Liberal Arts – Mathematics Option – LAMT – Associate in Arts

Please confer with the coordinator of the affected department.

Attach current and proposed academic maps (with changes in **bold**) for all affected programs. You can obtain academic maps from Barb Zabka.

N/A

Please submit a generic syllabus to your dean with all of the revisions included.

Please see attached.
Quinsigamond Community College
School of Math and Science

Instructor's Information:

Instructor:  <Professor John Smith>
Office:      <200A>
Email:       <jsmith@qcc.mass.edu>
Telephone:   508-854-2400

Course Information:

Course:      MAT 233 Calculus I – Section ##
Meets on:    <Mondays, Wednesdays, Fridays from 7:45am – 8:55am>
Credits:     4 credit hours
Semester:    <Fall 2020>

Course Description:

This course begins with a review of functions and functional notation. After introducing the limit and continuity theorems on an intuitive basis, the study of differentiation begins. Typical derivative formulae are applied to polynomial, rational, trigonometric, implicit, logarithmic, exponential, and inverse trigonometric functions. Application topics include extrema, related rates, curve sketching, and velocity and acceleration. The basic rules of integration and the substitution method are introduced along with Riemann Sums and the Fundamental Theorem of Calculus.

Pre-requisites:

MAT 124 College Mathematics II: Trigonometry or appropriate placement score

Required Textbook/Materials/Website:

Textbook:    Calculus by Briggs, Cochran, Gillet; Pearson Publishing, 3rd edition, © 2019
Materials:   Graphing calculator
Website:     Access to www.mymathlab.com

Student Learning Outcomes & Instructional Objectives:

This course is designed to achieve the following student outcomes and objectives:

- Define inverse, exponential, logarithmic, and inverse trigonometric functions.
• Use inductive and deductive reasoning.
• Evaluate the limits of a function as \( x \) approaches a point using numerical, graphical and analytical strategies.
• Evaluate the limits of a function as \( x \) approaches positive or negative infinity using numerical, graphical and analytical strategies.
• Calculate one-sided limits.
• Define continuity.
• Test a function for continuity.
• Identify values for \( x \) for which a function is discontinuous.
• Categorize a discontinuity as removable or singular.
• State the Intermediate Value Theorem and use it to prove the existence of roots of polynomials.
• Compute the derivative using the limit definition and the difference-quotient rule.
• Write the equation of the tangent line to a curve at a particular point.
• Discuss the connection between continuity and differentiability.
• Differentiate constant, polynomial functions as well as the sum & differences of functions.
• Define and correctly use the product and quotient rules.
• Differentiate trigonometric functions.
• Compute higher derivatives.
• Determine average and instantaneous velocity.
• Define instantaneous velocity as the first derivative of the position function.
• Define acceleration as the second derivative of the position function.
• Solve appropriate word problems using position, velocity and acceleration and their respective derivatives.
• Correctly recognize situations where the chain rule should be used and apply the rule correctly.
• Implicitly differentiate functions.
• Differentiate logarithmic and exponential functions.
• Correctly apply logarithmic differentiation.
• Differentiate inverse trigonometric functions.
• Differentiate inverse functions in general.
• Set up and solve equations involving related rate application problems.
• Define and identify where functions are increasing and decreasing using the first derivative test.
• Determine the local maxima and minima of a function using the first derivative test.
• Identify the absolute maximum and minimum of a function if they exist.
• Define and identify when functions are concave up and concave down using the second derivative test.
• Identify the inflection points of a function.
• Using information obtained from the first and second derivative tests, sketch the graph of a function.
• Set up and solve equations involving optimization application problems.
• Calculate limits using L’Hôpital’s rule.
• State and apply Rolle’s Theorem.
• State and apply the Mean Value Theorem.
• Calculate differentials and use them to compute error propagation.
• Use basic integration rules to find antiderivatives (power rule, trigonometric functions, exponential, logarithmic, inverse trigonometric functions).
• Use sigma notation to write and evaluate a sum.
• Understand the definition of a Riemann sum.
• Evaluate a definite integral using the Fundamental Theorem of Calculus.
• Employ the Second Fundamental Theorem of Calculus correctly using dummy variables.
• Compute definite and indefinite integrals using the Substitution Method.

Teaching Procedures:
Most classes will be a combination of lecture, group activities, and in-class assignments. You will be given homework assignments to be completed outside of class, with due dates/times. There will occasionally be a quiz or exam given in class.

Course Topics & Required Assignments/Readings:

Limits

• The Idea of Limits
• Definitions of Limits
• Techniques for Computing Limits
• Infinite Limits
• Limits at Infinity
• Continuity
• Precise Definitions of Limits

Derivatives

• Introducing the Derivative
• Rules of Differentiation
• The Product and Quotient Rules
• Derivatives of Trigonometric Functions
• Derivatives as Rates of Change
• The Chain Rule
• Implicit Differentiation
• Derivatives of Logarithmic and Exponential Functions
• Derivatives of Inverse Trigonometric Functions
• Related Rates

Applications of the Derivative

• Maxima and Minima
• Mean Value Theorem
• What Derivatives Tell Us
• Graphing Functions
• Optimization Problems
• L'Hôpital's Rule
• Anti-derivatives

Integration

• Approximating Areas under Curves
• Definite Integrals
• Fundamental Theorem of Calculus
• Working with Integrals
• Substitution Rule

Assignment & Test Schedule:

<list all assignments, quizzes, & exam dates>

Grading Breakdown:

25%  Homework
15%  Quizzes
10%  Attendance
20%  Exams
30%  Final Exam

A    95 – 100  B –  80 – 82  D+  67 – 69
A –  90 – 94  C+  77 – 79  D    63 – 66
B +  87 – 89  C    73 – 76  D –  60 – 62
B    83 – 86  C –  70 – 72  F    0 – 59

Attendance Policy:

Students are expected to attend all classes, for the entire period. Attendance will be taken during every class, and counts towards your final course grade. If you are absent from class, a doctor's note will excuse your absence.

Accessibility Statement:

If you have a disability which may require an accommodation, please notify me as soon as possible. You are responsible for forwarding your Accommodation Letter to me and discussing arrangements for this course. Your accommodations for this course begin upon my receipt of your Accommodation Letter; accommodations are not retroactive. You may request accommodations at any time during the semester, but instructors must be provided with reasonable notice prior to exams or deadlines.

Disability Services works to promote access to ensure an accessible college experience for students. If you have further questions, contact Disability Services. All discussions are confidential.
**Contact Information for Disability Services & Assistive Technology:**

Call: 508-854-4471  
Sorenson Video Phone: 508-502-7647  
Email: disabilityservices@qcc.mass.edu

**Services for Veterans:**

If you are a veteran of the armed forces, please visit the Veteran Affairs Office located in 258A (Administration Building) or contact them at veteranaffairs@qcc.mass.edu

**Academic Honesty and Plagiarism:**

Our purpose in the classroom is to seek the truth; this work requires trust and honesty between teacher and student. If we are not honest about what we know and don’t know, our learning will always be impaired. Because our teaching and learning depends on this honest communication, we expect all students to understand what plagiarism is and why it is unacceptable.

Plagiarism means taking someone else’s ideas or words and presenting them as one’s own. The offense can take many forms including cheating on a test, passing in a paper taken from the Internet or from another student, or failing to properly use and credit sources in an essay. Sometimes the issue is subtle, involving getting too much help on an assignment from someone else. In every instance, plagiarism means cheating both oneself and the owner of the source. Since the cheating sabotages a student’s learning experience, consequences range from no credit for the assignment to failure for the course and possible expulsion from the college.

For further information concerning plagiarism, refer to the QCC Student Handbook.
2020- 2021
QUINSIGAMOND COMMUNITY COLLEGE

COURSE REVISION PROPOSAL

1. Course Number and Name (current) : MAT 234 Calculus II

2. Originator: Math Department Date: 2/25/2021

3. School Dean: Dr. Benjamin Benton Date: 03/03/2021

4. Effective Date: Immediately

5. Reviewed by Program and Process (if applicable) Date:

6. Recommended by the School of __________________________ Date: _________________
   Comments:

7. AA Leadership Team: _________________________________ Date: _________________
   Recommended: __________ Not Recommended: __________
   Comments:

8. VP/Academic Affairs: _________________________________ Date: _________________
   Recommended: __________ Not Recommended: __________
   Comments:

9. Learning Council: _________________________________ Date: _________________
   Recommended: __________ Not Recommended: __________
   Comments:

10. VP/Academic Affairs: _________________________________ Date: _________________
    Approved: __________ Not Approved: __________
    Comments:
## COURSE REVISION PROPOSAL

**Type of Revision:**
- **X Description**
- ___ Prerequisite
- ___ Corequisite
- ___ Number
- ___ Name
- ___ #credits
- ___ Elective Type
- ___ other (explain)

<table>
<thead>
<tr>
<th>Course Discipline or Department: Mathematics</th>
<th>School: Math and Science</th>
</tr>
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<tr>
<td>Current Course Number: MAT 234</td>
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<tr>
<td>Current Course Name: Calculus II</td>
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**Current Course Description (as it appears in the college catalog including course three letter designation and number, title, credits, semesters offered and prerequisites/corequisites):**

**MAT 234 Calculus II**

This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be examined. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L’Hôpital’s Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.

Credits: 4
Semester Offered: F/S/SU
Prerequisites: MAT 233

**Proposed Description (include all proposed changes):**

**MAT 234 Calculus II**

This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be reviewed. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L’Hôpital’s Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.

Credits: 4
Semester Offered: F/S/SU
Prerequisites: MAT 233

**Rationale for the change:**
The Board of Higher Education (BHE) has endorsed the Final Report of the Task Force on Transitioning Developmental Math Education – Mathematics Pathways Subcommittee and has called upon institutions in public higher education to implement the recommendations in the report. Part of the report built upon the work from the MassTransfer Pathways process, to build a statewide transfer pathway in mathematics. A suggested content list was developed with the intention of providing guidance for the development of statewide equivalencies in mathematics courses. The primary goal is to ensure that students have similar experiences in mathematics courses so that, if they transfer, they are prepared to do well in upper-level courses.

Provide a description of any change in course content.

The QCC Math Department is submitting this Course Revision Proposal, along with the MAT 233 Course Revision Proposal, to revise the sequencing of topics in MAT 233 and MAT 234 to coincide with the suggested “Proposed Content for Calculus Sequence for STEM” list in Appendix B from the report. This change involves the following course objectives to be removed from MAT 234 and placed into MAT 233. Please note that the proposed revision to the MAT 234 course description would still allow these topics to be reviewed in MAT 234, with the goal of the topics being formally taught/analyzed in MAT 233.

- Calculate the derivatives of inverse functions.
- Evaluate inverse trigonometric functions.
- Compute derivatives and integrals involving inverse trigonometric functions.
- Correctly apply logarithmic differentiation.
- Calculate limits involving exponential functions using L’Hopital’s rule.

List the programs that are affected by this change (list program names and program codes as they appear in the college catalog):

- Computer Science Transfer - CS - Associate in Science (CS)
- Engineering – ERG - Associate in Science
- Engineering – Biomedical Engineering Option – ERBM - Associate in Science
- Liberal Arts - Chemistry Option – LACH - Associate in Arts
- Liberal Arts - Mathematics Option – LAMT – Associate in Arts

Please confer with the coordinator of the affected department.

Attach current and proposed academic maps (with changes in bold) for all affected programs. You can obtain academic maps from Barb Zabka.

N/A

Please submit a generic syllabus to your dean with all of the revisions included.

Please see attached.
Instructor's Information:
Instructor: <Professor John Smith>
Office: <200A>
Email: <jsmith@qcc.mass.edu>
Telephone: 508-854-2400

Course Information:
Course: MAT 234 Calculus II – Section ##
Meets on: <Mondays, Wednesdays, Fridays from 7:45am – 8:55am>
Credits: 4 credit hours
Semester: <Fall 2020>

Course Description:
This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be reviewed. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L'Hôpital’s Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.

Pre-requisite:
MAT 233

Required Textbook/Materials/Website:
Textbook: Calculus by Briggs, Cochran, Gillet, Schulz; Pearson Publishing, 3rd edition, © 2019
Materials: Graphing calculator
Website: Access to www.mymathlab.com

Student Learning Outcomes & Instructional Objectives:
This course is designed to achieve the following student outcomes and objectives:

- Evaluate velocity position and displacement.
• Calculate net change and future value.
• Evaluate the area of regions between curves.
• Understand the general slicing method and evaluate volume by slicing.
• Apply correctly the Disk and Washer methods.
• Calculate volume by shells.
• Evaluate the length of curves.
• Understand and evaluate the area of a surface of revolution.
• Define and calculate the work done by a variable force.
• Solve lifting problems.
• Define the natural logarithmic and exponential functions.
• Evaluate the derivative and integral of the exponential function.
• Define and correctly use the General Power Rule.
• Find growth rates using exponential models.
• Define the hyperbolic functions.
• Evaluate derivatives and integrals of hyperbolic functions.
• Use correctly integration by parts for indefinite integrals.
• Apply correctly trigonometric substitutions to evaluate integrals.
• Compute integrals using partial fractions.
• Approximate integrals using Numerical Integration.
• Evaluate Improper Integrals.
• Define and solve separable differential equations.
• Solve special first-order linear differential equations.
• Model with differential equations.
• Define and work with sequences.
• Evaluate the limit of a sequence.
• Evaluate geometric series.
• Determine the divergence of series using the divergence test.
• Determine the convergence or divergence of series using the Integral, Ratio, Root, and Comparison tests.
• Define and work with alternating series.
• Find Taylor polynomials of order $n$.
• Approximate functions with polynomials.
• Find the interval and radius of convergence of power series.
• Find Taylor and Maclaurin series for a function.
• Work with Taylor Series.

**Teaching Procedures:**

Most classes will be a combination of lecture, and in-class assignments. You will be given homework assignments to be completed outside of class, with due dates/times. There will occasionally be a quiz or exam given in class.

**Course Topics & Required Assignments/Readings:**

Applications of Integration
• Velocity and Net Change
• Regions Between Curves
• Volume by Slicing
• Volume by Shells
• Length of Curves
• Surface Area
• Physical Applications

Logarithmic and Exponential Functions

• Logarithmic and Exponential Functions Revisited
• Exponential Models
• Hyperbolic Functions

Integration Techniques

• Basic Approaches
• Integration by Parts
• Trigonometric Integrals
• Trigonometric Substitutions
• Partial Fractions
• Other Integration Strategies
• Numerical Integration
• Improper Integrals

Differential Equations

• Direction Fields and Euler’s Method
• Separable Differential Equations
• Special First-Order Linear Differential Equations
• Modeling with Differential Equations

Sequences and Infinite Series

• Sequences
• Infinite Series
• The Divergence and Integral Tests
• The Ratio, Root, and Comparison Tests
• Alternating Series

Power Series

• Approximating Functions with Polynomials
• Properties of Power Series
• Taylor Series
• Working with Taylor Series

Assignment & Test Schedule:

<list all assignments, quizzes, & exam dates>

Grading Breakdown:
25% Homework
15% Quizzes
10% Attendance
20% Exams
30% Final Exam

A 95 – 100       B – 80 – 82       D + 67 – 69
A – 90 – 94      C + 77 – 79      D 63 – 66
B + 87 – 89      C 73 – 76        D – 60 – 62
B 83 – 86        C – 70 – 72      F 0 – 59

**Attendance Policy:**

Students are expected to attend all classes, for the entire period. Attendance will be taken during every class, and counts towards your final course grade. If you are absent from class, a doctor's note will excuse your absence.

**Disability Statement:**

If you have a disability which may require an accommodation, please notify me as soon as possible. You are responsible for forwarding your Accommodation Letter to me and discussing arrangements for this course. Your accommodations for this course begin upon my receipt of your Accommodation Letter; accommodations are not retroactive. You may request accommodations at any time during the semester, but instructors must be provided with reasonable notice prior to exams or deadlines.

Disability Services works to promote access to ensure an accessible college experience for students. If you have further questions, contact Disability Services. All discussions are confidential.

**Contact Information for Disability Services & Assistive Technology:**

Call: 508-854-4471
Sorenson Video Phone: 508-502-7647
Email: disabilityservices@qcc.mass.edu

**Services for Veterans:**

If you are a veteran of the armed forces, please visit the Veteran Affairs Office located in 258A (Administration Building) or contact them at veteranaffairs@qcc.mass.edu

**Academic Honesty and Plagiarism:**
Our purpose in the classroom is to seek the truth; this work requires trust and honesty between teacher and student. If we are not honest about what we know and don’t know, our learning will always be impaired. Because our teaching and learning depends on this honest communication, we expect all students to understand what plagiarism is and why it is unacceptable.

Plagiarism means taking someone else’s ideas or words and presenting them as one’s own. The offense can take many forms including cheating on a test, passing in a paper taken from the Internet or from another student, or failing to properly use and credit sources in an essay. Sometimes the issue is subtle, involving getting too much help on an assignment from someone else. In every instance, plagiarism means cheating both oneself and the owner of the source. Since the cheating sabotages a student’s learning experience, consequences range from no credit for the assignment to failure for the course and possible expulsion from the college.

For further information concerning plagiarism, refer to the QCC Student Handbook.