

NEW DEGREE PROGRAM PROPOSAL

ASSOCIATE OF APPLIED SCIENCE (AAS)  
DEGREE  
IN  
MOBILE APPLICATION DEVELOPMENT

Information and Computing Studies Department  
National Technical Institute for the Deaf  
Rochester Institute of Technology

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# Table of Contents

|   |                                     |
|---|-------------------------------------|
| <b>Glossary of Acronyms</b> .....   | <b>4</b>                            |
| <b>1. Program Description and Purpose</b> .....   | <b>5</b>                            |
| A. Program Description .....  | 5                                   |
| B. Educational and Career Outcomes .....  | 6                                   |
| C. How the program fits with the institution's mission, vision, values and reputation. ....   | 7                                   |
| D. Describe the justification and need for this program and how this program contributes to RIT's strategic plan priorities and key result areas.....                       | 8                                   |
| E. Describe curricular features that: .....   | 10                                  |
| F. Description and list of documented curricular interconnections and integration between this program and other disciplines, programs and colleges at the University ..... | 10                                  |
| G. Role of faculty in the program's design .....  | 11                                  |
| H. Input by external partners .....   | 11                                  |
| I. Enrollment projections for Year 1 through Year 5.....  | 12                                  |
| <b>2. Program Courses and Schedule</b> .....  | <b>13</b>                           |
| A. Required and elective courses in the program .....   | 13                                  |
| B. Courses in Table 1a that satisfy RIT's General Education Framework .....   | 13                                  |
| C. See Appendix C for the following letters of support from other departments offering required courses .....   | 17                                  |
| D. Non-traditional schedule (e.g., off-campus, on-line, etc.) .....   | 17                                  |
| E. Copy of the current catalog description for existing courses .....   | 17                                  |
| F. See Appendix A for new course outlines .....   | 18                                  |
| <b>3. Faculty</b> .....   | <b>19</b>                           |
| <b>4. Financial Resources and Instructional Facilities</b> .....  | <b>22</b>                           |
| A. Instructional facilities and equipment needed to ensure the success of the program .....   | 22                                  |
| B. New program financial projections .....  | 23                                  |
| <b>5. Library Resources</b> .....   | <b>24</b>                           |
| A. Assessment of existing library resources by collection librarian .....   | 24                                  |
| B. Institution's response to identified needs .....   | 24                                  |
| <b>6. Admissions and Enrollment</b> .....   | <b>24</b>                           |
| A. List all program admissions requirements for the proposed program.....   | 24                                  |
| B. Describe the process for evaluating exceptions to admission requirements .....   | 25                                  |
| C. How will the institution encourage enrollment by persons from groups historically described as underrepresented in the discipline or occupation? .....                   | 25                                  |
| <b>7. Academic Support Services</b> .....   | <b>25</b>                           |
| <b>8. External Review of Graduate Programs</b> .....  | <b>25</b>                           |
| <b>9. Credit for Experience</b> .....   | <b>25</b>                           |
| <b>10. Program Assessment and Improvement</b> .....   | <b>25</b>                           |
| A. Program Level Outcomes Assessment.....   | 25                                  |
| B. Program Level Outcomes Assessment Plan .....   | 27                                  |
| C. Accreditation and Program Review.....  | 30                                  |
| <b>11. New/Emerging Field and Allied Health Areas</b> .....   | <b>30</b>                           |
| <b>12. Transfer to Baccalaureate Programs</b> .....   | <b>30</b>                           |
| <b>13. Application for Distance Education</b> .....   | <b>30</b>                           |
| <b>Appendix A - New or Revised Course Outline Form</b> .....  | <b>Error! Bookmark not defined.</b> |
| <b>Appendix B – Enrollment and Market Analysis</b> .....  | <b>Error! Bookmark not defined.</b> |
| A. Detailed enrollment projections for the next five years .....  | <b>Error! Bookmark not defined.</b> |
| B. Anticipated graduation rate .....  | <b>Error! Bookmark not defined.</b> |
| C. Competing programs (regional and national).....  | <b>Error! Bookmark not defined.</b> |
| D. Anticipated geographic draw (regional, national and international) .....   | <b>Error! Bookmark not defined.</b> |
| E. Program delivery format (full-time, part-time, on-site, off-site, distance learning, weekend learning).....  | 99                                  |
| <b>Appendix C – Internal Letters of Support</b> .....   | <b>Error! Bookmark not defined.</b> |
| <b>Appendix D – Program Need and Marketability</b> .....  | <b>Error! Bookmark not defined.</b> |

A. Program Demand and Fit with Student Skills .....**Error! Bookmark not defined.**  
B. RIT Rationale for the Program .....**Error! Bookmark not defined.**  
C. Graduate Marketability .....**Error! Bookmark not defined.**  
D. Input by External Partners.....**Error! Bookmark not defined.**  
E. External Letters of Support .....**Error! Bookmark not defined.**  
**Appendix E – Space Allocation/Renovation Request..... Error! Bookmark not defined.**  
**Appendix F – Faculty Curricula Vitae ..... Error! Bookmark not defined.**  
**Appendix G – Cost Model: Revenue/Cost Projections/Expenses ..... Error! Bookmark not defined.**

## **Glossary of Acronyms**

**(AAS)** Associate of Applied Science

**(BS)** Bachelor of Science Degree

**(COLA)** College of Liberal Arts

**(COS)** College of Science

**(DAS)** NTID's Department of Access Services

**(d/hh)** deaf and hard-of-hearing

**(GCCIS)** B. Thomas Golisano College of Computing and Information Sciences

**(HLC)** Hugh L. Carey

**(ICS)** Information and Computing Studies

**(IST)** Information Sciences and Technologies

**(LBJ)** Lyndon Baines Johnson

**(NTID)** The National Technical Institute for the Deaf

**(NYS)** New York State

**(RIT)** Rochester Institute of Technology

# 1. Program Description and Purpose

## A. Program Description

### 1. Overview

The Mobile Application Development program is an associate degree program that prepares students for work in the software development industry with a focus on application design and development for mobile platforms. Mobile app development is a field that brings concepts in programming, web development and interface design together. Using current and emerging technologies, students will develop skills in app design, learn relevant programming languages for application development on a variety of smart-devices and learn the policies and procedures for submitting apps for distribution.

The program is designed with 77 total credits of which 49 are technical credits, 24 are liberal arts and science credits, three credits for a free elective and one for *Freshman Seminar*. Courses cover multiple aspects of Internet and mobile-related technologies, including programming languages and web markup, server-side technologies and tools, mobile web development, responsive design and application optimization for mobile devices. Although the degree is designed and intended to be a career-focused terminal degree, students can continue their education by applying to transfer into the Information Technology baccalaureate degree program with a concentration in platform-specific mobile app development.

### 2. On-the-Job Responsibilities

Graduates of this program may work independently or with a team of programmers writing and developing software programs for mobile applications for contemporary devices. This requires skills in information gathering, user-centered design, effective deployment practices on a range of devices and strong communication skills.

### 3. Places of Employment

The majority of the graduates of this program will find jobs in public or private software development companies. Most often, these companies will specialize in web or mobile application development.

### 4. Prerequisites

ACT: Students with an ACT composite score of 17 or higher, with minimum scores of 18 in Mathematics, 16 in English, and 19 in Reading will be considered for direct admission to the program.

English: Placement in a First Year Writing course such as FYW: Writing Seminar (UWRT-150). Students that place into UWRT-100, Critical Reading and Writing would also be considered.

Mathematics: Placement into NTID Mathematics (NMTH-250) or higher. Typically, students entering this major will have completed at least three years of high school mathematics.

Science: Typically, students entering this major will have completed at least two years of high school science.

## ***B. Educational and Career Outcomes***

**1. Educational Outcomes** as recommended by the RIT Student Learning Outcomes Assessment Office:

### **Program Goals & Associated Student Learning Outcomes**

1. Create effective software solutions
  - Students will be able to analyze real world problems and efficiently code solutions.
2. Create effective and user-friendly mobile interfaces
  - Students will be able to design, refine and finalize a functional and user-friendly cross-platform user interface.
3. Publish applications across multiple platforms
  - Students will be able to create, secure, test and maintain mobile applications for two or more platforms
4. Utilize effective professional communication and collaboration skills.
  - Students will be able to demonstrate effective verbal and written communication skills.
  - Students will be able to work effectively as a member of a team.
5. Indicate overall satisfaction with the program and courses.
  - Graduating students will synthesize educational experience to determine level of satisfaction

## **2. Career Outcomes**

### **Career Education:**

The proposed program is designed to offer students a new degree option for an attractive career in mobile application development. The skills attained will prepare students for entry-level employment as application developers, web/mobile designers and/or developers, and computer programmers. It will also prepare them for opportunities to continue their education for a baccalaureate degree should they so choose. The curriculum will be responsive to technological advances and will prepare students to meet the demands in a continually evolving workplace.

### **Critical Thinking and Analytical Skills:**

Computer programming, which requires significant analytical skill development, is central to this AAS degree. In addition, students will enhance their abilities in reading, writing, visual communication, critical thinking, problem solving, science and mathematics. Students will have multiple opportunities in a variety of contexts to gather, process, organize and present information in technical and liberal arts courses. Because of this constantly evolving computing field, this program will provide a basis for a lifetime of intellectual inquiry.

### **Excellence:**

The field of mobile computing and more specifically mobile application development is still emerging and cutting edge. The importance of maintaining currency in mobile technologies will remain the driving force for faculty training and teaching excellence.

NTID students will be preparing for a career in a field where no NTID Associate degree program currently leads. Also, mobile app development students will take general education coursework in other colleges of RIT, thus adding to the diversity of student experiences in those classes. Students will demonstrate their abilities to

establish quality study skills as well as high standards of analytical and ethical conduct.

**Community and Personal Growth:**

Courses offer opportunities for self-discovery, personal and social responsibility, and enhancement of interpersonal skills as well as promoting career awareness. Liberal studies in global, social, artistic and ethical focus areas as well as extensive technical education promote community and personal growth. As members of the NTID and broader RIT communities, students will have opportunities to expand their intellectual, social and cultural experiences with deaf/hard-of-hearing and hearing students.

A learning support community established for students with activities both in and out-of-class will allow for increased peer support and additional faculty and student interaction, which is expected to enhance retention and increase graduation rates.

**Lifelong Learning:**

Because of the constantly evolving nature of mobile computing and smart devices, this program will promote the inclination and habit of intellectual inquiry conducive to a lifetime of learning.

***C. How the program fits with the institution's mission, vision, values and reputation.***

The Mobile Application Development program is consistent with the missions of the university and the college by focusing on an emerging area to which graduates will be able to contribute their creative products and faculty/staff will be able to pursue new directions of scholarship.

From the RIT and NTID Mission Statements:

*“RIT’s mission is to provide a broad range of career-oriented educational programs with the goal of producing innovative, creative graduates who are well-prepared for their chosen careers in a global society.*

*We rigorously pursue new and emerging career areas. We develop and deliver curricula and advance scholarship and research relevant to emerging technologies and social conditions.”*

*NTID’s primary mission is “to provide deaf and hard-of-hearing students with outstanding state-of-the-art technical and professional education programs, complemented by a strong arts and sciences curriculum that prepares them to live and work in the mainstream of a rapidly changing global community and enhance their lifelong learning.”*

The Mobile Application Development program will be a new and innovative addition to the NTID education portfolio that will allow students to earn an associates’ degree in the new and rapidly growing field of mobile computing. Faculty will work collaboratively with industry partners to develop stimulating projects and foster experiential learning through capstone and co-op. The students will be well-prepared to meet the challenges of working in this growing field or to continue their education in other colleges within RIT.

**1. Innovative and well-prepared:**

This is the first (and only) mobile application development program currently offered in New York State using a platform-agnostic (cross-platform) approach to teaching mobile application development. This innovative approach will open job opportunities for our students unavailable to native platform developers. Additionally, according to the NYS Inventory of Registered Programs, there are only three other associate degree level mobile app development programs offered in NYS, and two of them are offered in a distance learning only format.<sup>1</sup>

Taking advantage of the eleven in-class technical courses dedicated specifically to mobile app development, much of the instruction in this program will be interactive and will include the use of new and emerging mobile smart devices, making students well-prepared to meet the demands of industry.

**2. Creative, collaborative and experiential:**

The industry partnerships we have developed will offer the opportunity to create and implement real-world solutions to industry problems in capstone and co-op. This collaborative and experiential learning environment will provide students with a real-life learning environment to better prepare them for the workplace of the 21<sup>st</sup> century.

The nature of this emerging, career-oriented Mobile Application Development program will require creativity from students in designing mobile applications. These apps will be designed and applied to state-of-the-art smart devices and wearable technologies.

A learning support community established for each new year of students will allow faculty and students to work together on both in and out-of-class activities and promote peer support.

**3. Synergistic and interdisciplinary:**

The NTID program is interdisciplinary, integrating the mobile application development technical courses with a business course (World of Business and Innovation) and a workplace related course (The World of Work) to provide students with a broader educational experience.

The program provides for lifelong learning opportunities through a synergistic balance of technical credits and arts and science credits preparing students to work in a changing global community.

***D. Describe the justification and need for this program and how this program contributes to RIT's strategic plan priorities and key result areas***

Due to the explosive growth in the use of mobile devices to access and use the Internet, there's been a boom in the field of mobile application (app) development. In 2012, deployment and use of mobile applications created a \$53 billion economy and by 2016, it is expected to rise to \$143 billion.<sup>2</sup> Additionally, by 2016, the global app economy is expected to account for 33% of the combined app services and handset market (up from 18% in 2012) which is an indication that the number of apps will continue to grow and outpace the value of handsets on a yearly basis.<sup>3</sup>

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<sup>1</sup> <http://www.nysed.gov/heds/IRPSL1.html>

<sup>2</sup> Godfrey, Jonathan and Reed III, Morgan. "App Store after Five Years." ACT: The App Association, 19 July 2013

<sup>3</sup> Christina Voskoglou. "App Economy Forecasts. 2013-2016" DE: Developer Economics. 17 July 2013.

Smart phones, smart things, tablets and wearable devices will continue to change the way we communicate, do business and access news & entertainment. With that, the demand for new and innovative mobile apps is growing and will continue to grow. *The increased demand “translates to one of the largest IT skills gaps ever realized – there are simply more mobile app development job openings than skilled application developers to fill them.”*<sup>4</sup>

*“ITCareerFinder, an on-line portal for helping IT professionals advance their careers, assembled a comparison of the decade’s hottest technology careers. These careers will experience the fastest growth through 2020, pay salaries well above the national average, boast top employment, and offer a range of advancement opportunities.”*<sup>4</sup>

According to ITCareerFinder, the Mobile Application Developer position was highlighted as being the best computer career for the future. The Bureau of Labor Statistics predicts that the number of Computer Software Programmer jobs will grow by 28% (much faster than average) from 2010 to 2020 and that mobile app developers will have approximately 82,000 jobs for associate degree holders during that period.<sup>5</sup>

According to an article published by the Online Learning Consortium, “Mobile Apps are the fastest growing dimension of the mobile space in higher education right now, with impacts on virtually every aspect of informal life, and increasingly, every discipline in the university.”<sup>6</sup>

From the RIT Strategic Plan:

*“Our mission is to provide technology-based tracks for personal and professional development. We rigorously pursue new and emerging career areas. We develop and deliver curricula and advanced scholarship relevant to emerging technologies and social conditions.”*

This program responds to employment opportunities in the new and emerging career area of mobile computing. Working with industry partners, students and faculty can engage in scholarship opportunities.

## **1. Student Success**

Student success will be realized by:

- a) students and faculty engagement through a learning support community.
- b) student, faculty and industry collaboration in the capstone course.
- c) student and faculty interaction in scholarship opportunities.
- d) real-world experience with industry partners offered through co-op.
- e) increased job opportunities because of cross-platform app development experience.

## **2. Innovation, Creativity, Research and Scholarship**

The nature of this emerging, career-oriented Mobile Application Development program will require creativity from students in designing mobile applications. These

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<sup>4</sup> Greenspan, Daniel. “IT Career Paths.” IT Career Finder, July 2014.

<sup>5</sup> Bureau of Labor Statistics. Occupational Outlook Handbook. < <http://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm>> Retrieved 1 Oct 2014.

<sup>6</sup> <http://onlinelearningconsortium.org/institute/asynchronous-workshop/2014/10/24/introduction-mobile-apps-and-tablets>

apps will be designed and applied to state-of-the-art smart devices and wearable technologies. Mobile devices are rapidly becoming universal as they are being adopted by many currently excluded groups who have never used computing devices before, including senior, disabled or illiterate individuals. To be successful, mobile application developers need to learn and incorporate universal design (assessable design) principles. NTID researchers in the Center of Access Technology are in the forefront of accessible design and access technologies as applied to deaf, hard of hearing and low vision. The combination of research expertise and consumer needs as it applies to universal/accessible design will result in many research and scholarship opportunities for faculty and deaf and hard-of-hearing students.

### **3. Organizational/Operational Excellence**

The program will be assessed by both RIT's comprehensive assessment review as well as by a diverse group of industry advisors providing continual feedback on areas where the program can be improved.

### **4. Stakeholder satisfaction**

There will be several opportunities to assess stakeholder satisfaction. They are:

- a) Students in the Mobile Application Development program will be assessed annually in terms of their satisfaction with the program and the department.
- b) Students will be assessed by their employers at the end of the required co-op in the summer between their fourth and fifth semester.
- c) Employer-partners from whom we get mobile app development projects will assess satisfaction with the student work at the end of the capstone course.

The results of the surveys will be reviewed annually by both the ICS department and Mobile App Development industry partners.

## ***E. Describe curricular features that:***

### **1. Facilitate and support student and faculty scholarship, research and creativity**

The curriculum offers faculty and students opportunities for scholarship of discovery leading to the design and development of unique and creative apps. Apps designed for universal access in particular, will provide significant research and scholarship opportunities.

### **2. Address emerging disciplines**

Mobile app development is an emerging discipline in the field of mobile computing. Students will be introduced to and will work with state-of-the-art mobile and wearable technologies to produce applications.

## ***F. Description and list of documented curricular interconnections and integration between this program and other disciplines, programs and colleges at the University***

The following courses are being taken outside of the Mobile Application Development program.

NACT-240 The World of Work: Students will take this course from the Career-Focused Applied Computer Technology program in the ICS department to prepare for the challenges of the workplace.

NBUS-211 World of Business and Innovation: Students will be encouraged to pursue entrepreneurial endeavors and as such, take a course offered by the NTID Business Studies department the focusing business studies including the topic of entrepreneurship.

NACA-172 Website Development: Students will take this course from the AS-BS degree program in ICS designed for transfer to the GCCIS IT program.

All liberal arts, science and Math courses: These courses provide a strong foundation for learning and for living and working in an increasingly diverse community and workplace.

Technical Electives: Eligible technical electives are shown in Table 1a with approvals noted in respective internal Letters of Support (**Appendix C**). Students can take a technical elective from the NACA or NACT programs in ICS, those wishing to continue their education for a baccalaureate degree will be encouraged to take their technical elective course in GCCIS’s IST department (specifically the IT program) to allow for maximum credit transfer.

***G. Role of faculty in the program’s design***

The proposed AAS in Mobile Application Development program was proposed and designed by the chairperson and the Mobile Application Development curriculum team in the NTID Information and Computing Studies Department. Several faculty members provided expertise in developing and reviewing proposed courses. Faculty from the entire department reviewed the full program proposal along with the new courses and provided feedback. Additionally, several faculty members from the GCCIS Information Sciences and Technologies (IST) and Interactive Games and Media (IGM) department reviewed the proposed coursework and provided feedback.

***H. Input by external partners***

A Curriculum Advisory Board was assembled to review the proposed Mobile App Development program. This board was comprised of nine representatives from the mobile computing Industry, three individuals from RIT BS level programs with strong knowledge of mobile app development, two from an out-of-state community college with a degree program in mobile app development and an NTID employment advisor.

The curriculum advisory board members who reviewed the Mobile Application Development program course mask and course descriptions are shown below. Qualifications can be found in **Appendix D**.

| <b>Name</b>     | <b>Title</b>                | <b>Organization</b>              |
|-----------------|-----------------------------|----------------------------------|
| Craig Lamb      | Partner and CIO             | Envative                         |
| David Mastrella | Partner and Chief Architect | Envative                         |
| Todd Bernhard   | CEO                         | No Tie Software                  |
| Steve Maier     | Senior Technical Evangelist | Microsoft                        |
| Ian Caspersson  | President                   | IC9 Design                       |
| Mark Navarra    | Recruiting Manager          | Wellington Steele and Associates |
| R. John Gaudu   | VP and Founding Partner     | Wellington Steele and Associates |
| Paul Solt       | CEO                         | Artwork Evolution                |
| Jesse Black     | Software Consultant         | Self-Employed                    |

|                          |                           |                                   |
|--------------------------|---------------------------|-----------------------------------|
| Dr. Larry Ray            | Program Chair             | Stark State College, Canton, Ohio |
| Sharon Hoover            | Instructor                | Stark State College, Canton, Ohio |
| Bryan French             | Lecturer                  | GCCIS/RIT                         |
| Dan Bogaard              | Associate Professor       | GCCIS/RIT                         |
| Anthony Jefferson        | Senior Lecturer           | GCCIS/RIT                         |
| Regina Kiperman-Kiselgof | Senior Employment Advisor | NTID/RIT                          |

After reviewing our program and curriculum plans with them, the advisory board provided input that was generally very positive and helpful. It is summarized in **Appendix D**. We were able to use their input to make program improvements that are reflected in the program mask, course descriptions and course outlines. Additionally, several members of the advisory board were eager to offer continued assistance in an advisory role, assist in faculty training, work with the students on capstone projects, consider hiring prospective graduates and even possibly provide some hardware and software. (See External Letters of Support in **Appendix D**)

### ***I. Enrollment projections for Year 1 through Year 5***

For two years, the ICS department in NTID has been offering a special topics course called “Windows Phone App Development“. Each time the course has been offered, we have achieved maximum class enrollment. Most of the students taking the course are either currently or formerly in one of ICS’ associate degree programs.

In the spring of 2014, the ICS department conducted a one-question clipboard survey for all students in the ICS department to gauge student interest in a program focusing on mobile app development. The question posed was, “If a program that teaches how to create apps on mobile devices (smartphones, tablets, etc.) were offered when you came to NTID, would you have considered applying to this program?” The results were profound. Of 51 respondents, 45 answered “Yes”.

Based on the app development course we offered, the student survey we conducted, program awareness opportunities through the NTID dual credit program (where students can take a pre-approved course in high school that awards both high school and college credit), and the natural affinity young people have for mobile devices, we anticipate this will be a popular program. Resource constraints however will require us to limit enrollment to 12 new students per year, with new students accepted only in fall semesters. Students accepted into this program will be screened to meet the enrollment criteria of this associate degree. The screening includes, but is not limited to math and English placement testing once they arrive at RIT, evaluation of transfer credits from other post-secondary institutions, and honors, AP or dual credits from high school.

Detailed Mobile Application Development enrollment projections, market analysis, and graduation rate projections that were reviewed and approved by Dr. Jim Miller, Senior VP of Enrollment Management and Career Services at RIT can be seen in **Appendix B**. The abbreviated table below shows the projected enrollment for five years and reflects an anticipated 80% retention through year one (Fall, Year 1 to Fall, Year 2) and 72% retention through year 2, (Fall, Year 2 to Fall, Year 3). At the end of fall semester, Year 3, nine students will have graduated from the program, taking the total number of students in the spring semester, Year 3 down to 22 from 31 in the fall semester.

| <b>Enrollment</b>             | <b>Year 1<br/>AY16-17</b> | <b>Year 2<br/>AY17-18</b> | <b>Year 3<br/>AY18-19</b> | <b>Year 4<br/>AY19-20</b> | <b>Year 5<br/>AY20-21</b> |
|-------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Enrollment Fall Semester      | 12                        | 22                        | 31                        | 31                        | 31                        |
| Enrollment Spring Semester    | 12                        | 22                        | 22                        | 22                        | 22                        |
| Total Semesters of Enrollment | 24                        | 44                        | 53                        | 53                        | 53                        |

## 2. Program Courses and Schedule

The proposed Mobile Application Development program offers a comprehensive curriculum designed with 77 total credits of which 49 are technical credits, 24 are liberal arts and science credits, three credits for a free elective and one for *Freshman Seminar*. The 77 credits hours will be taken over five semesters with one co-op experience between the fourth and fifth semester.

### A. *Required and elective courses in the program*

#### AAS Credit Summary

- Total of 77 credits, 24 courses, projected over five academic semesters
- Technical Component = 49 credits / 15 courses (which includes one 3-credit Technical Elective)
- Liberal Arts and Sciences Components = 24 credits / 8 courses
- Other courses = 3 credits /1 course Free Elective; 1 credit *Freshman Seminar*  
Wellness Education = 0 credit
- Co-op Work Experience between fourth and fifth semester

### B. *Courses in Table 1a that satisfy RIT's General Education Framework*

The following general education courses are part of Table 1a.

#### 1. Foundation Courses

- a. UWRT-150 FYW: Writing Seminar
- b. LAS Elective

#### 2. Perspectives for AAS Degree

- a. LAS- Perspective 1 (Ethical)
- b. LAS- Perspective 2 (Artistic)
- c. LAS- Perspective 3 (Global)
- d. LAS- Perspective 4 (Social)
- e. LAS- Perspective 6 (Scientific Principles)

#### 3. Immersion – Not required for AAS degree

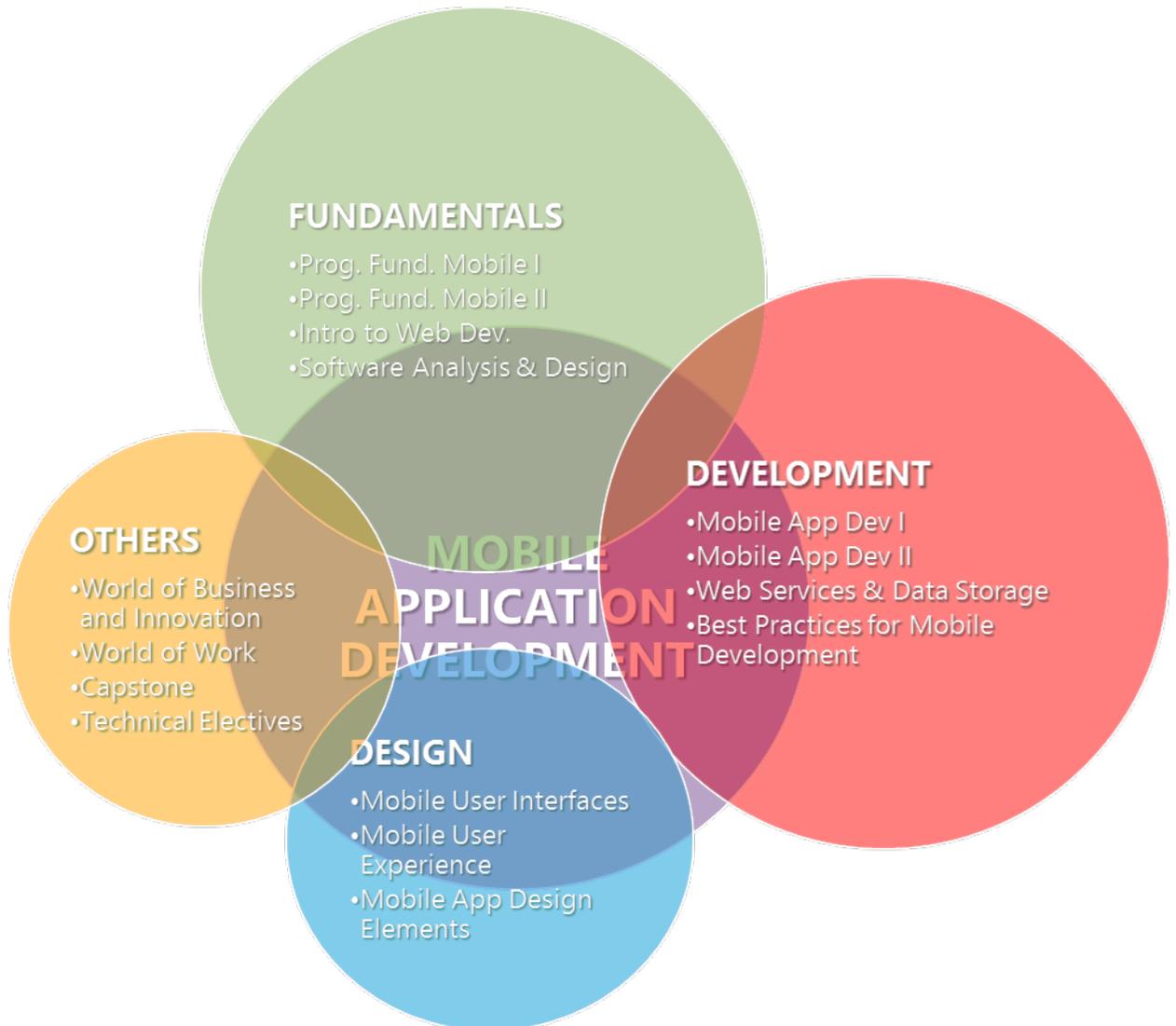
#### 4. General Education Electives

- a. NMTH-255 Introduction to Discrete Mathematics

## 5. Wellness Education

### C. Technical Courses

The technical courses that make up the Mobile Application Development program fit into four basic categories; Fundamentals, Development, Design and Other.



**Fundamentals:** App programming (coding) is typically the most difficult area for students to master. For this reason we are utilizing increased contact hours with students in the Programming Fundamentals I and II courses where we will introduce the programming language C#. Past experiences have shown that learning programming alone is not sufficient to gain a solid understanding of programming and how objects communicate with each other. For that reason, we developed a course called Software Analysis and Design. This course will emphasize the importance of writing good and efficient app programs, not just programs that work. The Web course will introduce students to basic HTML code so they can develop a simple website on which they can present a portfolio of projects they have worked on.

**Development:** We will be going beyond the fundamentals of C# and introduce *Xamarin*, a cross platform framework with the goal of creating apps that work across multiple platforms. As Steve Maier of Microsoft says, *“I like your plans to use Xamarin and C# as the method of delivering the content to students.” [The plan] “has been well thought out and fits well into the market today and in the future. More and more apps are moving in a cross-platform direction and introducing students to this in the degree will definitely benefit them.”* The Mobile App Development I and II courses will focus more on the back-end of programming and emphasize more on the overall app experience where performance and battery life are critical issues to address. The Web Services and Data Storage course will focus more on aggregating data from various sources across the web and displaying them in a space-efficient manner.

**Design:** Users expect great experiences and naturally we believe that apps must perform well and be complemented with pleasing aesthetics. A basic understanding of the design principles and app design guidelines will be taught in the Mobile User Interfaces course. To gain a better understanding of the user experience as it relates to app use is critical, which is why we developed the Mobile User Experience course to emphasize the importance of usability studies and user feedback. Students will learn the front-end development in the Mobile App Design Elements course and understand the various controls, navigation patterns and other UI elements.

**Others:** Another important area in the curriculum labeled “Other” include the Capstone Projects course where students, mentored by Mobile App Development faculty, will work with an employer-partner to develop an app that the employer needs. The employer will determine the requirements of the app and students will work with them to achieve the goal of producing a publishable app.

In the World of Business and Innovation course, students are exposed to typical business organizations, learn organizational structure, and gain a basic understanding of entrepreneurship. The World of Work course will also focus on the workplace, preparing students for job search, preparing resumes and reinforcing workplace principles such as workplace ethics and other soft skills necessary for gainful employment.

### **Improved Retention and Student Success through a Learning Support Community**

An important aspect of this program will involve the use of a learning support community involving both Mobile App Development students and faculty. With the anticipated academic demand of the Mobile Application Development program, the establishment of a learning support community will serve to foster student retention and student success. This learning support community will bring students and faculty together in various activities such as code competition, guest speakers, code hour, team building exercises as a means of building self-confidence and promoting greater progress in academics. Faculty will not be the center of this learning support community, but become an advocate or mentor on the sidelines to support students and the learning support community outside of the classroom. Students will form relationships with other peer students and inherently develop life skills. Additionally, there will be industry experts getting involved in offering support and advice to the learning support community.

**Table 1a: AAS in Mobile Application Development**

| ASL-Deaf Cultural Studies*                                    |    |             |     |     |                                 |   |    |           |     |     |                           |  |  |
|---|----|-------------|-----|-----|---------------------------------|---|----|-----------|-----|-----|---------------------------|--|--|
| Term: Fall Year 1   |    |             |     |     |                                 | Term: Spring Year 1                                 |    |           |     |     |                           |  |  |
| Check course classification (s)                               |    |             |     |     |                                 | (Check course classification (s))                   |    |           |     |     |                           |  |  |
| Course Number & Title   | CR | LAS         | Maj | New | Prerequisite(s)                 | Course Number & Title                               | CR | LAS       | Maj | New | Prerequisite(s)           |  |  |
| NCAR-100 Freshman Seminar                                     | 1  |             |     |     |                                 | UWRT-150 First Year Writing: Writing Seminar        | 3  | X         |     |     |                           |  |  |
| LAS Elective*   | 3  | X           |     |     |                                 | NMTH-255 Introduction to Discrete Mathematics       | 3  | X         |     | X   | NMTH-212 or eq.; UWRT-100 |  |  |
| NACA-172 Website Development                                  | 3  |             | X   |     |                                 | NMAD-181 Programming Fundamentals II: Mobile Domain | 4  |           | X   | X   | NMAD-180                  |  |  |
| NMAD-180 Programming Fundamentals I: Mobile Domain            | 4  |             | X   | X   |                                 | NMAD-182 Software Analysis and Design               | 3  |           | X   | X   | NMAD-180                  |  |  |
| LAS Artistic Perspective*                                     | 3  | X           |     |     |                                 | NMAD-150 Mobile User Interfaces                     | 3  |           | X   | X   | NACA-172                  |  |  |
| Term credit total:  | 14 | 6           | 7   |     |                                 | Term credit total:                                  | 16 | 6         | 10  |     |                           |  |  |
| Term: Fall Year 2   |    |             |     |     |                                 | Term: Spring Year 2                                 |    |           |     |     |                           |  |  |
| Check course classification (s)                               |    |             |     |     |                                 | (Check course classification (s))                   |    |           |     |     |                           |  |  |
| Course Number & Title   | CR | LAS         | Maj | New | Prerequisite(s)                 | Course Number & Title                               | CR | LAS       | Maj | New | Prerequisite(s)           |  |  |
| NMAD-260 Mobile App Development I                             | 4  |             | X   | X   | NMAD-181; 182                   | NMAD-261 Mobile App Development II                  | 4  |           | X   | X   | NMAD-260                  |  |  |
| NMAD-251 Mobile App Design Elements                           | 3  |             | X   | X   | NMAD-150                        | NMAD-270 Best Practices for Mobile Development      | 3  |           | X   | X   | NMAD-260                  |  |  |
| NMAD-250 Mobile User Experience                               | 3  |             | X   | X   | NMAD-150                        | NMAD-262 Web Services and Data Storage Technologies | 3  |           | X   | X   | NMAD-260                  |  |  |
| NACT-240 The World of Work                                    | 3  |             | X   |     |                                 | LAS Scientific Principles Perspective               | 3  | X         |     |     |                           |  |  |
| LAS Ethical Perspective*                                      | 3  | X           |     |     |                                 | LAS Social Perspective*                             | 3  | X         |     |     |                           |  |  |
|   |    |             |     |     |                                 | Wellness Education                                  | 0  |           |     |     |                           |  |  |
| Term credit total:  | 16 | 3           | 13  |     |                                 | Term credit total:                                  | 16 | 6         | 10  |     |                           |  |  |
| Term: Summer Year 2   |    |             |     |     |                                 | Term:   |    |           |     |     |                           |  |  |
| Check course classification (s)                               |    |             |     |     |                                 | Check course classification (s)                     |    |           |     |     |                           |  |  |
| Course Number & Title   | CR | LAS         | Maj | New | Prerequisite(s)                 | Course Number & Title                               | CR | LAS       | Maj | New | Prerequisite(s)           |  |  |
| NMAD-299 Mobile Application Development Co-op Work Experience | 0  |             | X   | X   | NACT -240<br>NMAD-261, 262, 270 | N/A   |    |           |     |     |                           |  |  |
| Term credit total:  | 0  | 0           | 0   |     |                                 | Term credit total:                                  |    |           |     |     |                           |  |  |
| Term: Fall Year 3   |    |             |     |     |                                 | Term:   |    |           |     |     |                           |  |  |
| Check course classification (s)                               |    |             |     |     |                                 | Check course classification (s)                     |    |           |     |     |                           |  |  |
| Course Number & Title   | CR | LAS         | Maj | New | Prerequisite(s)                 | Course Number & Title                               | CR | LAS       | Maj | New | Prerequisite(s)           |  |  |
| NBUS-211 World of Business and Innovation                     | 3  |             | X   |     |                                 |   |    |           |     |     |                           |  |  |
| Free Elective*  | 3  |             |     |     |                                 |   |    |           |     |     |                           |  |  |
| Technical Elective**  | 3  |             | X   |     |                                 | N/A   |    |           |     |     |                           |  |  |
| NMAD-290 Mobile Application Development Capstone Projects     | 3  |             | X   | X   | NMAD-261; 262; 270              |   |    |           |     |     |                           |  |  |
| LAS Global Perspective*                                       | 3  | X           |     |     |                                 |   |    |           |     |     |                           |  |  |
| Term credit total:  | 15 | 3           | 9   |     |                                 | Term credit total:                                  |    |           |     |     |                           |  |  |
| Program Totals:   |    | Credits: 77 |     |     | Liberal Arts & Sciences: 24     |   |    | Major: 49 |     |     | Elective & Other: 4       |  |  |

\* An ASL-Deaf Cultural Studies (AASASLDCS) course is required for graduation. It can be taken in any semester and can be taken at NTID or another college of RIT. In order to fulfill this requirement as part of the 77 credits in the program, it can be a course approved for *both* AASASLDCS *and* an LAS Perspective or LAS Elective, or it can be used as the Free Elective.

\*\* The Mobile Application Development program Technical Elective can be: Web Implementation (NACA-174), Programming Fundamentals II (NACA-161), Web and Mobile I (ISTE-140), Intro to Database and Data Modeling (ISTE-230), Java for Programmers (ISTE-200), or a course from another program with approval of the ICS Department Chair and the Department Chair of the program offering the course.

***C. See Appendix C for the following letters of support from other departments offering required courses***

1. **Elissa Olsen** – Department Chair, NTID Information and Computing Studies
2. **Mary Lou Basile** – Department Chair, NTID Business Studies
3. **Jennifer Gravitz** – Department Chair, NTID Liberal Studies
4. **Matthew Lynn** – Department Chair, NTID Science and Mathematics
5. **James Winebrake**– Dean, College of Liberal Arts

***D. Non-traditional schedule (e.g., off-campus, on-line, etc.)***

Not applicable. All of the courses will be offered on campus in classrooms or labs.

***E. Copy of the current catalog description for existing courses***

**NCAR-100**

**Freshman Seminar**

The course provides entering NTID students with opportunities to develop/enhance academic skills, personal awareness, and community involvement in order to maximize their college experience. Students have opportunities to explore and navigate the college environment, develop/reinforce academic skills and participate in service learning opportunities. Students are encouraged to establish meaningful connections with faculty, staff and peers. The course promotes the development of plans for ongoing growth and involvement in class and in the RIT/NTID and/or broader community.

**Class 1, Lab 1, Credit 1 (F,S)**

**NACA-172**

**Website Development**

This course introduces students to web page and small-scale website development. Through hands-on laboratory experiences, students will learn the fundamental concepts needed to construct web pages that follow appropriate coding standards as well as basic design principles to present content in an attractive and organized manner. Topics include HTML, CSS, graphical elements, website publishing, and transfer protocols.

**Class 2, Lab 3, Credits 3 (F,S)**

**NACT-240**

**The World of Work**

The goal of the course is to provide students with the business-related skills to acquire a cooperative or permanent job, and the personal and social skills to succeed on the job. Topics related to workplace communication and relationships, as well as financial management, employer expectations, and personal goal setting will also be covered. The course will also include the development of job search skills, resume writing and interviewing, along with skills in word processing, spreadsheets and presentation software as needed in the workplace.

**Class 3, Credits 3 (F)**

**NBUS-211**

**World of Business and Innovation**

This course is an overview of the functions and processes of business organizations. Topics include the roles and responsibilities of the manager, managing business ethics

and social responsibility, competing in a global environment, organizational structure and authority, and managing diversity, change, communication and innovation.

**Class 3, Credits 3 (F,S)**

**UWRT-150**

**First Year Writing - Writing Seminar**

First Year Writing is a three-credit seminar limited to 21 students per section. The course is designed to develop first-year students' proficiency in analytical writing, rhetorical reading, and critical thinking. Students will read, understand, and interpret a variety of texts representing different cultural perspectives and/or academic disciplines. Academic, non-fiction texts, chosen around a particular theme, are designed to challenge students intellectually and to stimulate their writing for a variety of contexts and purposes. Through inquiry-based assignment sequences, students will develop academic research and literacy practices that will be further strengthened throughout their academic careers. Particular attention will be given to the writing process, including an emphasis on teacher-student conferencing, self-assessment, class discussion, peer review, formal and informal writing, research, and revision; small class size promotes frequent student-instructor and student-student interaction. The course also emphasizes the principles of intellectual property and academic honesty for both current academic and future professional writing.

**Class 3, Credit 3 (F, S, Su)**

***F. See Appendix A for new course outlines***

### 3. Faculty

All of the NTID technical, mathematical and science courses are taught by NTID faculty who use direct instruction, including, but not limited to: sign language, spoken language, printed/visual aids, web-based instructional materials, and individual tutoring. The remainder of the courses in the AAS program will be taught by either NTID faculty who use direct instruction or by COLA faculty, depending on the courses and sections chosen to fulfill the liberal arts requirements.

Analysis shows a need for a total of 2.17 FTE to cover the ICS courses in this program. As shown in tables 2 and 4, one new FTE lecturer will be hired to cover two courses in the new program and six other ICS courses that are currently taught by the faculty who will be reassigned to teach the Mobile Application Development courses. The remaining 1.17 FTE will be covered by reassignments in faculty workload that have resulted in a capacity to offer more courses in the department. This additional capacity is primarily the result of two tenured faculty who had reduced teaching loads due to grant work now being assigned to full time grant work and having their teaching load covered by lecturers who can teach an additional number of courses beyond what the two tenured faculty were teaching.

There will be no impact on the course offerings for other ICS programs or the students' ability to graduate on time.

**Table 2: Current Faculty, Full-Time**

| Faculty Member Name and Title/Rank at Institution (include and identify Program Director)                      | Program Courses which may be Taught   | Percent of Teaching Time for Program Courses | Highest and Other Applicable Earned Degrees and Disciplines (include College/University) | Additional Qualifications: list related certifications/ licenses; professional experience in field, scholarly contributions, other academic affiliations.                                 |
|--|---|--|--|---|
| Olsen, Elissa<br>-Department Chair<br>-Mobile Application Development Program Director<br>-Assistant Professor | N/A   | 0%   | M.S., Software Development and Management,<br>Rochester Institute of Technology          | 21 years in Higher Education as Teacher and Administrator<br><br>13 years as Industry Programmer  |
| Brian Trager<br>-Assistant Professor   | NMAD-181 Programming Fundamentals II: Mobile Domain<br><br>NMAD-182 Software Analysis and Design<br><br>NMAD-251 Mobile App Design Elements<br><br>NMAD-261 Mobile App Development II | 66.67%<br><br>(4 courses)                    | M.S., Information Technology,<br>Rochester Institute of Technology                       | 11 years Teaching in Higher Ed<br><br>Almost \$200,000 in Funded Research as PI or Co-PI<br><br>Extensive Publications, Conference Presentations,<br><br>CAID, SIGSCE, RESNA, SITE member |

|   |  |                       |   |  |
|---|--|-----------------------|---|--|
| Chris Campbell<br>- Lecturer              | NMAD-250 Mobile User Experience<br>NMAD-260 Mobile App Develop I<br>NMAD-270 Best Practices for<br>Mobile Developers<br>NMAD-262 Web Services and Data<br>Storage Technologies | 50%<br>(4 courses)    | M.S., Computer Information<br>Systems,<br>University of Phoenix | 3 years Teaching in Higher Ed<br>12 years as Software Developer<br>3 years as Business Analyst   |
| Raja Kushalnagar<br>- Assistant Professor | NMAD-150 Mobile User Interfaces  | 25%<br>(1 course)     | Ph.D. Computer Science, University<br>of Houston                | 5 year Teaching in Higher Ed<br>5 years Industry Experience<br>Certified Information Systems<br>Security Professional (CISSP)<br>Received over \$375,000 in<br>Funded Research as PI or Co-PI<br>Extensive Peer-Reviewed and<br>Published Research<br>ACM, IEEE, USENIX member |
| Karen Beiter<br>- Assistant Professor     | NACT-240 The World of Work<br>NACA-172 Website Development   | 33.34%<br>(2 courses) | M.S. Computer Science,<br>Rochester Institute of Technology     | 21 years Teaching in Higher Ed<br><br>11 years as Computer Systems<br>Analyst<br><br>Research experience in Assistive<br>Technology<br><br>ACM/SIGSCE member   |
| Joseph Stanislaw<br>-Assistant Professor  | NMAD-180 Programming<br>Fundamentals I: Mobile Domain  | 16.67%<br>(1 course)  | M.S. Computer Science<br>Stevens Institute of Technology        | 13 years Teaching in Higher Ed.<br>20 years Industry Experience<br>CompTIA A+ Certification<br>Extensive Research, Publications<br>and Conference Presentations<br>ACM, ASEE, CAID member  |
| TBD (Lecturer to be<br>hired)             | NMAD-290 Mobile Application<br>Development Capstone Projects<br>NCAR-100 Freshman Seminar  | 25%<br>(2 courses)    | Unknown until the lecturer is determined                        | Unknown until the lecturer is<br>determined  |

**Table 3: Current Faculty, Part-Time**

| Faculty Member Name and Title/Rank at Institution (include and identify Program Director) | Program Courses which may be Taught | Highest and Other Applicable Earned Degrees and Disciplines (include College/University) | Additional Qualifications: list related certifications/licenses; professional experience in field, scholarly contributions, other academic affiliations. |
|---|-------------------------------------|--|--|
| N/A   | N/A                                 | N/A  | N/A  |

**Table 4: Faculty to be Hired, Full-Time**

In year two, the current ICS faculty teaching courses for the Mobile Applications Development program will not be able to teach courses which they currently teach. A new lecturer will have to be hired. When the new lecturer is hired, he/she will teach eight courses (such two courses for the Mobile Applications Development program NMAD-290 and NCAR-100 identified in Table 2) plus six ICS courses, such as those identified below in Table 4.

| Title/Rank of Position | # of New Positions | Minimum Qualifications (including degree and discipline area)        | Expected course assignments  | Expected Hiring Date (mm/dd/yy) |
|------------------------|--------------------|--|--|---------------------------------|
| Lecturer               | 1                  | MS in Computer Science, Information Technology or related discipline | NACT-120 Introduction to Computer Applications<br>NACT-151 Windows Operating Systems<br>NACT-170 Introduction to Website Development<br>NACT-230 Introduction to Programming<br>NACT-235 Introduction to Database Applications<br>NACT-240 The World of Work | 08/22/2017                      |

The NTID Department of Science and Mathematics will be teaching one mathematics course for this program to be offered once a year and the NTID Business Studies Department will teach one course from their program. As can be seen in the letters of support in **Appendix C**, both of these can be accomplished with current mathematics and business department faculty resources. As we continue to refine the course offerings, where appropriate, we may solicit the expertise of other departments if their skill sets fit areas of needed expertise.

If needed, the ICS department maintains a list of adjunct faculty available for courses in our programs.

See **Appendix F** for the Curricula Vitae of faculty listed in Table 2.

## 4. Financial Resources and Instructional Facilities

### A. *Instructional facilities and equipment needed to ensure the success of the program*

#### 1. **Space**

With the additional 12 students per year students and the addition of 14 new courses (including special topics, independent study, Mobile Application Development co-op) to the ICS portfolio of courses, lecture and lab space will be impacted. There is a pending move of the ICS department from the HLC building to the LBJ building. In the most recent design there is an (approximate) 450 sq. ft. lab designated for the Mobile Application Development lab. With two classrooms dedicated to the ICS department in the most recent design, there will be sufficient classroom space for the Mobile Application Development program (as well as current ICS programs).

In a letter of support provided by Erwin Smith, Assistant Vice President for Information Technology and College Operations dated 10/24/2014, he writes: “*NTID is renovating nearly 9,000 sq. ft. in LBJ Hall to support the Information Computing Studies programs. Approximately 450 sq. ft. on the 1<sup>st</sup> floor of LBJ Hall will be allocated to the proposed Mobile Application Device (MAD) program. NTID is working with FMS and HBT Architects to finalize the design and construction schedule.*” See Allocation for Space Request in **Appendix E**.

#### 2. **Lab or studio space/equipment to be shared**

Two labs, one to be used as a general ICS “Self-Instruction Lab” (in which students in all ICS programs can work on homework, get course tutoring, check electronic communications, etc.), and another, the “Multimedia Lab” will be shared with other ICS programs. Classroom space will also be shared with other ICS programs. See **Appendix C** for the letter of support from Elissa Olsen, Chairperson of ICS indicating approval for shared space.

#### 3. **Equipment specific to the Mobile Application Development program**

Because mobile devices become dated so quickly, we anticipate a need to annually replace a portion of the smart devices used for app development at an anticipated cost of approximately \$2000/yr. These can be obtained through the NTID annual department equipment request, using department funds, grants, or may be obtained through industry partners/corporate donations.

#### 4. **Computer facilities**

The Mobile Application Development lab and the ICS general purpose classrooms will be equipped with appropriate computer facilities to accommodate the maximum class size of 12 students. The lab will be equipped with sufficient benches, electrical capacity, internet connections, and computers.

#### 5. **Other space and equipment needs**

There are no additional space needs.

We project an approximate \$2000 annual software cost for cross-platform development kits. The software can be obtained using department funds, grants, or may be obtained through industry partners/corporate donations. Other needed software is readily available without an extra cost.

**B. New program financial projections**

The NTID cost model analysis in **Appendix G** prepared by Mr. Steve Morse, Assistant Vice President for NTID Finance and Budget, includes four tables detailing projected expenditures and revenue over the first five years of the program. There are no anticipated capital expenditures. New Program costs for each year over a three-year period are shown below in Table 5. These costs include faculty/staff salary and benefits plus costs such as computers, instructional supplies, telephone, software licenses, travel/conferences, and tuition payment for RIT credits.

**Table 5**, New Resources is shown below. For more information on the new program cost model, see **Appendix G**.

**Information and Computing Studies Department**

**Mobile Application Development Associate of Applied Science Degree Program**

**Projected Expenditures For The Proposed Program**

**Table 5 – New Resources**

*Additional Salary & Benefits for 1.0 FTE Lecturer. This hire is required by the home department to teach other department courses (unrelated to this new program) starting in year 2 (2017-2018) which previously would have been taught by faculty teaching in this new program.*

| New Expenditures                                   | Year 1           | Year 2           | Year 3           |
|--|------------------|------------------|------------------|
| Personnel  |                  | \$80,000         | \$83,000         |
| Library  |                  |                  |                  |
| Equipment  |                  |                  |                  |
| Laboratories                                       |                  |                  |                  |
| Supplies & Expenses (Other Than Personal Service)* | \$26,200         | \$39,200         | \$45,400         |
| Capital Expenditures                               |                  |                  |                  |
| Other **   | \$104,600        | \$137,500        | \$155,400        |
| <b>Total all</b>                                   | <b>\$130,800</b> | <b>\$256,700</b> | <b>\$283,800</b> |

\* The amounts in this row represent RIT computer charges for students/faculty/staff involved in the program, instructional supplies, telephone charges, software licenses, and travel/conferences for faculty. A breakdown of these expenses may be found on Table 1 – Projected Expenditures for the Proposed Program.

\*\* The amounts in this row represent tuition payments for RIT credits and overhead (RIT indirect costs). A breakdown of these expenses may be found on Table 1 – Projected Expenditures for the Proposed Program.

## 5. Library Resources

### A. *Assessment of existing library resources by collection librarian*

NTID Education Librarian, Joan Naturale, stated that *“This program will have a minimal impact on the library’s services and collection of books, journals, and databases.”*

Please refer to a supporting letter from Joan Naturale in **Appendix C**.

### B. *Institution’s response to identified needs*

“The Wallace library’s **Computer Science and Information Technology collection of journals, books, and databases** supports the associate degree programs for the technical and design aspects of Mobile App Development.”

## 6. Admissions and Enrollment

### A. *List all program admissions requirements for the proposed program*

Applicants must meet the general requirements for acceptance to RIT through NTID as detailed in RIT’s Undergraduate Bulletin. RIT and the U.S. Department of Education have agreed on these standards.

Entry criteria into this AAS degree program in Mobile Application Development will be based on the applicant’s projected ability to complete graduation within a typical program mask timeline. Incoming first-year NTID students pursuing this degree option will need to meet the following entry requirements:

ACT: Students with an ACT composite score of 17 or higher, with minimum scores of 18 in Mathematics, 16 in English, and 19 in Reading will be considered for direct admission to the program.

English: Placement in a First Year Writing course such as FYW: Writing Seminar (UWRT-150). Students that place into UWRT-100, Critical Reading and Writing would also be considered.

Mathematics: Placement in NTID Mathematics (NMTH-250) or higher. Typically, students entering this major will have completed at least three years of high school mathematics.

Science: Typically, students entering this major will have completed at least two years of high school science.

Internal transfer students who are pursuing this degree option will need to meet the entry requirements for this program as follows:

- Successful completion of NTID NMTH-212 level mathematics course (or equivalent)
- Successful completion of Critical Reading & Writing (UWRT-100) or equivalent;
- Overall GPA in courses at NTID/RIT of 2.8 or higher

**B. Describe the process for evaluating exceptions to admission requirements**

The department chairperson will reserve the right to evaluate borderline applicants through the normal NTID admission process.

**C. How will the institution encourage enrollment by persons from groups historically described as underrepresented in the discipline or occupation?**

The NTID Admissions Office will recruit and admit deaf and hard-of-hearing students both nationally and internationally. Recruitment practices and procedures will be in accordance with those established by NTID and RIT to promote diversity in the program.

## **7. Academic Support Services**

The ICS department will use a variety of approaches to advise and counsel students in the Mobile Application Development program including use of the NTID Counseling and Academic Advising department who will assign an advisor/counselor to work with our department to serve these students.

Support Services typically used for baccalaureate level programs, including interpreting and note taking, are not applicable to this program (except for liberal arts courses taught by non-NTID faculty) since the Mobile Application Development program is designed as an associate (terminal) degree. However, should a student choose to transfer to a GCCIS program upon completion of this degree, NTID has maintained a strong commitment to the support of d/hh students in baccalaureate programs with special tutoring, interpreting/captioning, and note taking for each course.

## **8. External Review of Graduate Programs**

Not applicable.

## **9. Credit for Experience**

Substantial credit for prior learning derived from experience will not be granted for the Mobile Application Development program.

## **10. Program Assessment and Improvement**

### **A. Program Level Outcomes Assessment**

The essential goal of the Mobile Application Development program is to prepare students for employment as mobile application developers. Students will gain fundamental skills and knowledge related to mobile application development. The curriculum is designed to foster the development of both hard and soft skills that students will need to begin a successful career.

The curriculum, along with the Program Level Outcomes Assessment Plan, was designed to incorporate a broad view of the mobile application development field. The courses include instruction in object oriented programming, an introduction to HTML and

web development, user interface and user interactive design principles, web services, data acquisition and storage techniques, best practices as it relates to security and general design principles, and soft skills such as effective workplace communications, ethics and social responsibility.

The Mobile Application Development program aligns with the RIT academic program profile by providing students with knowledge and understanding of the following:

- Principles and practices of the mobile computing profession, where the outcomes of technical literacy, ethical reasoning and global interconnectedness are essential.
- Application planning and design that align well with the essential outcomes of critical, creative and innovative thinking.
- The impacts of mobile computing solutions in a global and societal context where outcomes of critical thinking, ethical reasoning, and integrative literacies are fundamental to improvements for society anywhere in the world.

See the Table 6 on the following page for the Outcomes Assessment Plan for the AAS in Mobile Application Development. The chairperson of the Information and Computing Studies department at NTID will coordinate the assessment process. Data will be collected and discussed at annual departmental meetings. Results of outcomes assessment measures and the use of results will be reported at the college level on a yearly basis and posted to RIT's Assessment Management System website at <http://www.taskstream.com>. The AAS program will be evaluated, annually, based on student success in meeting the identified outcomes and consideration of emerging trends in liberal arts education.

**B. Program Level Outcomes Assessment Plan**

**Table 6**

**Program Name/College:** Mobile Application Development / National Technical Institute for the Deaf (NTID)  
**Program Contact for Program Assessment:** Elissa Olsen (Department Chair)

| Program Goals                        | Student Learning Outcomes   | Academic Program Profile  | Data Source/Measure Curriculum Mapping  | Benchmark   | Timeline   | Data Analysis Key Findings                        | Use of Results Action Items and Dissemination   |
|--------------------------------------|---|---|---|---|--|---|---|
| Please List program-level goals      | Students will be able to: (task, capability, knowledge, skills, and dispositions) Use measurable verbs. | Alignment to the five RIT essential outcomes - check all that apply   | Assessment opportunity (course/experience) method/measures, assignment/rubric)                | Standard, target, or achievement level (usually a %) Statement of student Success   | Identify when and how data are collected, aggregated, and analyzed                       | Identify who is responsible and list key findings | Identify how results are used and shared. List any recommendations or action items  |
| Create effective software solutions. | Analyze real world problems and efficiently code solutions  | <input checked="" type="checkbox"/> Critical Thinking<br><input checked="" type="checkbox"/> Ethical Reasoning<br><input type="checkbox"/> Integrative Literacies<br><input type="checkbox"/> Global Interconnectedness<br><input checked="" type="checkbox"/> Creative/Innovative Thinking | NMAD-181 Programming Fundamentals II: Mobile Domain Final Written Exam                        | 80% of students will score a 75% or higher on exam.   | Each semester the NMAD-181 Programming Fundamentals II: Mobile Domain course is offered. | Collected by ICS Dept. Assessment Coordinator     | Shared with the program faculty, annual college summary report, NTID Annual Report, and the greater Institute as requested. |
|                                      |   |   | NMAD-181 Programming Fundamentals II: Mobile Domain Real world problem analysis - UML Diagram | 80% of the students will score a 75% or higher on the UML Diagram   |  |   |   |
|                                      |   |   |   | Given a UML diagram, 80% of the students will score a 75% or higher in being able to correctly and efficiently code a solution. |  |   |   |

| Program Goals   | Student Learning Outcomes   | Academic Program Profile  | Data Source/Measure Curriculum Mapping   | Benchmark   | Timeline   | Data Analysis Key Findings                    | Use of Results Action Items and Dissemination   |
|---|---|---|--|---|--|---|---|
|   |   |   | NMAD-290 Mobile Application Development Capstone Projects Course Comprehensive   | 80% of students will score a 2 or higher with a rubric scale 0-3 on project sections related to being able to correctly and efficiently code a solution.  | Each semester the NMAD-290 Mobile Application Development Capstone Projects course is offered.   |   |   |
| Create effective and user-friendly mobile interfaces. | Design, refine and finalize a functional and user-friendly cross-platform user interface. | <input checked="" type="checkbox"/> Critical Thinking<br><input checked="" type="checkbox"/> Ethical Reasoning<br><input type="checkbox"/> Integrative Literacies<br><input type="checkbox"/> Global Interconnectedness<br><input checked="" type="checkbox"/> Creative/Innovative Thinking | NMAD 250 Mobile App Design Elements Final Project<br><br><hr/> NMAD-290 Mobile Application Development Capstone Projects Course (Project TBD)                      | 80% of the students will earn a 75% or higher score on the NMAD Mobile App Design Elements Final Project<br><br><hr/> 80% of students will score a 2 or higher with a rubric scale 0-3 on the NMAD-289 Project      | Each semester the NMAD-250 Mobile App Design Elements course is offered.<br><br><hr/> Each semester the NMAD-290 Mobile Application Development Capstone Projects course is offered. | Collected by ICS Dept. Assessment Coordinator | Shared with the program faculty, annual college summary report, NTID Annual Report, and the greater Institute as requested. |
| Publish applications across multiple platforms.       | Create, secure, test and maintain mobile applications for two or more platforms           | <input checked="" type="checkbox"/> Critical Thinking<br><input type="checkbox"/> Ethical Reasoning<br><input checked="" type="checkbox"/> Integrative Literacies<br><input type="checkbox"/> Global Interconnectedness<br><input checked="" type="checkbox"/> Creative/Innovative Thinking | NMAD-270 Mobile App Development II Final Exam or instructor evaluation (Project TBD)<br><br><hr/> NMAD-290 Mobile Application Development Capstone Projects Course | 80% of the students will score a 75% or higher on the NMAD-270 Final Exam or Project (TBD)<br><br><hr/> 80% of students will score a 2 or higher with a rubric scale 0-3 on each section of the Capstone Project(s) | Each semester the NMAD-270 Mobile App Development II course is offered<br><br><hr/> Each semester the NMAD-290 Mobile Application Development Capstone Projects course is offered.   | Collected by ICS Dept. Assessment Coordinator | Shared with the program faculty, annual college summary report, NTID Annual Report, and the greater Institute as requested. |

| Program Goals   | Student Learning Outcomes  | Academic Program Profile  | Data Source/Measure Curriculum Mapping  | Benchmark  | Timeline  | Data Analysis Key Findings                    | Use of Results Action Items and Dissemination   |
|---|--|---|---|--|---|---|---|
| Utilize effective professional communication and collaboration skills | Demonstrate effective verbal and written communication skills        | <input type="checkbox"/> Critical Thinking<br><input checked="" type="checkbox"/> Ethical Reasoning<br><input checked="" type="checkbox"/> Integrative Literacies<br><input checked="" type="checkbox"/> Global Interconnectedness<br><input type="checkbox"/> Creative/Innovative Thinking | NMAD-270 Mobile App Development II Team Project   | 100% of the students will demonstrate effective interpersonal and communication skills on the team project rubric (peer and faculty evaluations)                   | Each Semester NMAD-270 Mobile App Development II is offered.                                  | Collected by ICS Dept. Assessment Coordinator | Shared with the program faculty, annual college summary report, NTID Annual Report, and the greater Institute as requested. |
|   | Work effectively as a member of a team                               |   | NMAD-290 Mobile Application Development Capstone Projects Course  | 100% of students will score a 2 or higher with a rubric scale 0-3 on project section sections related to interpersonal and communication skills                    | Each semester the NMAD-290 Mobile Application Development Capstone Projects course is offered |   |   |
| Indicate overall satisfaction with the program and courses.           | Synthesize educational experience to determine level of satisfaction | <input type="checkbox"/> Critical Thinking<br><input type="checkbox"/> Ethical Reasoning<br><input type="checkbox"/> Integrative Literacies<br><input type="checkbox"/> Global Interconnectedness<br><input type="checkbox"/> Creative/Innovative Thinking                                  | Student satisfaction survey instrument<br>When the survey instrument is developed, indicate specific survey items that you will use for assessment of this outcome. | 85% of students graduating will indicate "satisfaction" with Mobile Application Development courses and the program on the Student satisfaction survey instrument. | Collection: Annually at the end of the fall semester beginning AY 2019/2020                   | Collected by ICS Dept. Assessment Coordinator | Shared with the program faculty, annual college summary report, NTID Annual Report, and the greater Institute as requested. |

### ***C. Accreditation and Program Review***

No external organizations other than NYSED and Middle States will evaluate/accredit the program.

## **11. New/Emerging Field and Allied Health Areas**

Although this is an emerging program in the field of mobile computing, several such mobile app programs are already in place in other universities. The field of mobile computing has existed now for quite a few years.

## **12. Transfer to Baccalaureate Programs**

The Mobile Application Development program is intended as a terminal degree. Once established, the ICS department will work to establish an articulation agreement with the RIT's IST department. The IST department Coordinator, Dan Bogaard has reviewed the program mask and course descriptions for the Mobile Application Development program. As stated in his letter of support (see **Appendix C**), "*...at least some of the technical courses will be able to transfer for credit towards a BS level degree in our department. Once the program gets fully approved and I have had the opportunity to review the complete syllabi, we can meet again to review course transferability and draft an articulation agreement.*"

Entry into other four-year programs, either within or outside RIT may be possible as well, although the number of credits accepted for transfer may be less.

## **13. Application for Distance Education**

Not applicable for this AAS degree program.