Concept Paper for the proposed
NTID Associate of Applied Science in
Mobile Application Design and Development

I. Title/Department/College

Associate of Applied Science in Mobile Application Design and Development
Information and Computing Studies department, National Technical Institute for the Deaf (NTID)

II. Goals and Justification for the Proposed Program

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. 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.

Estimates indicate that mobile subscriptions reached seven billion at the end of 2013 and will reach 9.1 billion by 2018. The International Data Corporation (IDC) estimates that mobile web usage will overtake PC web usage by 2015, making mobile web strategy more important for businesses than their PC web strategy. Because of unpredictable platform dominance, a platform-agnostic strategy, i.e., cross-platform mobile apps, messaging, and utilization of web services are important.

As smart phones, smart things, tablets and wearable devices continue to change the way we communicate, do business and access news & entertainment, the demand for new and innovative mobile apps is growing at an incredible speed. This 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.

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. 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.

Based on these findings, NTID's Information and Computing Studies (ICS) department proposes a new AAS degree program in Mobile Application Design and Development. The goals of this program are to:
- Provide students with an understanding of the project workflow in the Mobile App Development industry.
- Develop Programming skills in creating apps across multiple platforms.

- Apply human-computer interaction concepts and techniques in designing and planning user interface design of mobile apps.
- Publish mobile applications on multiple platforms.
- Develop a greater understanding of the business landscape involving mobile apps and services.
- Develop team-based collaboration and communication skills.
- Understand the employment opportunities for students with an associate level degree in this major.

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 continued education should a student choose to continue for a baccalaureate degree.

III. Description of the New Program

Mobile application development is a specialized field where concepts of web development, interface design and computer programming merge. Using current and emerging technologies, students will develop skills in website and native 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 works to develop skills through practical application of current and emerging standards and technologies across multiple mobile devices.

Due to the inability to predict platform dominance, our program will offer a cross-platform development environment that allows for the creation of device specific software applications for a broad range of mobile devices. We will also teach students the need for responsive design that allows for optimal viewing across a wide range of devices.

To that end, the ICS curriculum team has worked diligently to make the program well-balanced and technically strong. It is designed with 73 total credits of which 48 are technical credits, 24 are liberal arts and science credits, and one is 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 as a career focused, terminal degree, opportunities for transfer into baccalaureate programs are possible.

As can be seen on the planned course mask (next page), the courses in the first and second semester allow students to develop important foundational skills in English, mathematics, web and interface development, and programming. In the third and fourth semester, students will build on those skills and focus more on cross-platform app design and development concepts as well as integrated web services and data storage techniques. A required cooperative work experience in the summer between the fourth and fifth semester will allow students to put their skills to work in a business environment. During the fifth semester, students will take a business course to further their understanding of the business world and will continue the ICS tradition of doing a capstone project. In this capstone course, student will work with local business partners to develop a mobile application.

PLANNED Semester AAS in Mobile Application Design & Development Curriculum

Fall Semester (1ˢᵗ year)	Credits	Spring Semester (1ˢᵗ year)	Credits
☐ NCAR-100 Freshman Seminar	1	☐ UWRT-150 First Year Writing: Writing Seminar	3
☐ First-year Seminar	3	☐ NMTH-2XX Intro to Discrete Math	3
☐ NACA-172 Website Development	3	☐ NMAD-1XX Programming Fundamentals II –	
☐ NACA-160 Programming Fundamentals I	3	Mobile Domain	3
☐ NMAD-1XX Mobile Communications Security	3	☐ NMAD-1XX User Interface Design	3
	13	☐ LAS Perspective 1 - Ethical	3
			15

Fall Semester (2ⁿᵈ year)	Credits	Spring Semester (2ⁿᵈ year)	Credits
☐ NMAD-2XX User Interface & Experience	3	☐ NMAD-2XX Best Practice for Mobile Development	3
☐ NMAD-2XX Cross-Platform App Development I	3	☐ NMAD-2XX Cross Platform App Development II	3
☐ NMAD-2XX Cross-Platform App Design Elements	3	☐ NMAD-2XX Web Services and Data Storage	
☐ NACT-240 World of Work	3	Technologies	3
☐ LAS Perspective 2 - Artistic	3	☐ LAS Perspective 6 - Scientific Principles	3
	15	☐ LAS Perspective 4 - Social	3
		☐ Wellness Education	0
			15

Fall Semester (3ʳᵈ year)	Credits	
☐ NBUS- 200 Orientation to Business	3	A summer co-op work experience is required between the fourth and fifth semester.
☐ Technical Elective	3	
☐ Technical Elective	3	
☐ NMAD-2XX MADD Technical Capstone	3	**Note:** Courses with XX numbers are new
☐ LAS Perspective 3 - Global	3	
	15	

IV. Fit with RIT Academic Portfolio Blueprint Characteristics and Criteria

Examples of how the proposed program fits the academic portfolio blueprint characteristics and criteria are outlined below.

Characteristics:
- **Innovative Teaching and Learning:**
  Much of the instruction in this program will be interactive and will include the use of new and emerging mobile smart devices and wearable technology.

- **Experiential Learning:**
  A capstone project course during the last semester will allow students the opportunity to work directly with a business to create and implement a mobile app. Additionally, students will be required to have one co-op work experience before they graduate.

- **Synergy and Interdisciplinarity:**
  Students will benefit from the Programming Fundamentals I course from the NTID Applied Computer Technology AS (NACA) program, World of Work course from the

Applied Computer Technology AAS/AOS (NACT) program and the Orientation to Business course from the NTID Business Studies Department (NBUS), as students prepare for the challenges in the workplace.

- **Inclusive Excellence:**
  NTID students will be preparing for careers in a field where no NTID Associate degree programs currently lead. Also, MADD students will take general education coursework in other colleges of RIT, thus adding to the diversity of student experiences in those classes.

Criteria:

I. **Centrality:**
From the RIT Strategic plan and its mission statement: "Our mission is to provide technology-based education tracks for personal and professional development. We rigorously pursue **new and emerging career areas**. We develop and deliver curricula and advance scholarship relevant to emerging technologies and social conditions." This program addresses the new and rapidly growing market of mobile application development and use.

II. **Marketability**
For two years, the ICS department in NTID has been offering a special topics course called "Windows Phone App Development". Demand for a program in app development has been demonstrated through the healthy mix of students at all degree levels (AOS/AAS/AS/BS) requesting this course because young students have exhibited a natural affinity for mobile devices. 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. The students with an AAS degree (or higher) who have taken this course have shown high rates of success in it which bodes well for the program being proposed.

III. **Quality**
Faculty members within the program will have sufficient expertise to teach these technical courses, assuring quality course delivery. Incorporating a capstone course as part of the required curriculum will expose students to opportunities to work in partnership with companies interested in mobile app development. This will give industry exposure to students and help provide them with enhanced career employment opportunities.

IV. **Financial Viability**
Financial viability of the program can be seen by the cost model which has been provided to the Provost and referenced in Section VIII, "Impact on Resources".

V. Synergy with Other Programs

Although this career-focused AAS degree program will provide ample opportunity for entry level employment, our curriculum team met with faculty in the Information Sciences and Technologies (IST) department in the B. Thomas Golisano College of Computing and Information Sciences to consider opportunities for baccalaureate transfer and to identify the skills needed to successfully make the transition. The IST department offers an IT degree with a concentration in Mobile Application

Development where successful students in the AAS program can continue their studies in platform specific app development.

As identified in an attached letter of support, the IST Department Chair, Professor Steve Zilora stated, "…I believe you will be doing a very good job preparing your students for employment as well as preparing them to continue their studies with a BS in Information Technology should they so choose." In another attached letter of support, Professor Stephen Jacobs, Associate Director of the MAGIC Center and Professor in the IGM Department says, … "The mobile development world is one of the most vibrant sectors of computing today… I believe [the curriculum your department has developed] will provide them with a solid, foundational understanding of the different aspects of design required for mobile development …" "I look forward to seeing your students engaging with us in the MAGIC Center."

VI. Administrative Structure for the New Program

The administrative structure of the proposed program will follow the standard administrative structure of NTID. The chair will appoint a program coordinator and work with the coordinator as needed relative to administrative duties such as course scheduling, faculty assignments, and program budget.

VII. Enrollment Management Expectations and Sustainment

We anticipate this will be a popular program but will be limiting semester enrollment to 10 new students per year. This enrollment projection was certified by Dr. Jim Miller, Sr. VP Enrollment Management and Career Services, who stated, "The current projection of 10 incremental new students annually is a reasonable market expectation. I estimate that a few more than 10 could be achieved if desired."

We anticipate that we can fill the enrollment demand from students that would not otherwise come to NTID.   Students accepted into this program will be screened to meet the enrollment criteria of this associate degree, meaning they have the ACT scores and high school mathematics coursework that indicate readiness to take the courses identified in the first semester of the planned course mask.

Enrollment projections are shown in the table for years 1-5. This table shows an anticipated 90% retention per year and that by year 3, a total of 27 students would be expected each fall semester.

Enrollment	Year 1 AY15-16	Year 2 AY16-17	Year 3 AY17-18	Year 4 AY18-19	Year 5 AY19-20
Enrollment Fall Semester	10	19	27	27	27
Enrollment Spring Semester	10	19	19	19	19
Total Semesters of Enrollment	20	38	46	46	46

VIII. Impact on Resources

Utilization of Existing Resources

The ICS department typically admits 30-40 students each fall semester into the various programs. With 10 additional students, we are anticipating this program will increase the total number of students accepted in the department by approximately 20-25%.   The addition of 10 new courses to the ICS portfolio of courses, may impact lecture and lab space but due to the pending move of the ICS department from HLC building to the LBJ building, impact on space resources cannot be fully determined.

Analysis showed a need for 2.5 FTE to cover the courses in this program. Based on that, we anticipate the need to hire one additional ICS faculty member (lecturer) for this program starting in fall 2016. This incremental expense is reflected in the cost model.

The NTID Math department has agreed to develop one new math course for this program (to be offered once a year) and the NTID Business department has agreed to allow our students to take one business course. Both of these will be accomplished with current Math 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.

We project a $1200 annual software cost for cross-platform development kits paid for through annual ICS budget resources. Other software is readily available without an extra cost. Computers used for other software instruction are available from other ICS course offerings. Because mobile devices become dated so quickly, we anticipate a need to annually replace a portion of the smart devices used for app development.

Cost Model Analysis

The NTD cost model analysis, which will be forwarded to the Provost, includes four tables detailing projected expenditures and revenue over the first five years of the program. There are no anticipated capital expenditures. Faculty/staff salary and benefits plus costs such as computers, instructional supplies, telephone, software licenses, travel/conferences, and tuition payment for RIT credits total approximately $346K. These costs are projected to be offset by more than $1.56M in tuition revenue. Total revenue minus expenses over the five years is estimated to be approximately $1.2 million. [Note that NTID's tuition is applied to support all academic and non-academic programs accessed by students and the program does not fit into the Net Tuition Revenue Model used by other RIT colleges. Tuition is subsidized by federal appropriations and is therefore not cost related.]

IX. Conclusion

In summary, the AAS degree in Mobile Application Design and Development will allow us to expand our portfolio of offerings into this rapidly expanding IT field.   This program will provide unique technical education opportunities for students and subsequent employment opportunities.

This concept paper was developed and reviewed by the ICS curriculum committee:

Brian Trager, chair, and committee members comprised of the faculty in the ICS department.

X. Summary of Community Input and Response to Input

The AAS in Mobile Application Design and Development Concept Paper was posted for community vetting from 2/26/14 to 3/26/14. During that time feedback was received from one individual who

was highly supportive and noted that this is "a great way for our NTID students to learn valuable and practical skills in our 21st century technological culture." This feedback was from the Chair of the Liberal Studies Department at NTID who indicated she looked "forward to providing the English coursework to support students in this major."

It should also be noted that prior to the community vetting, the program initiators sought feedback from faculty in the Information Sciences and Technologies (IST) department in the B. Thomas Golisano College of Computing and Information Sciences. Their support is referenced in Section V of this concept paper and the letters of support are attached to this document.

R·I·T

Rochester Institute of Technology

Stephen J. Zilora
Associate Professor and Chair
Department of Information Sciences & Technologies
(585) 475-7643   Fax: (585) 475-2181
Email: steve.zilora@rit.edu

February 13, 2014

David Lawrence
Information and Computing Studies
National Technical Institute for the Deaf

Dear Dave,

I am writing in support of NTID's proposed AAS in **Mobile Application Design and Development**. Here in the Information Sciences and Technologies department we are seeing explosive growth in student interest in our mobile application development courses. This interest is driven not only by the natural affinity young people have with the mobile world, but also by the increasing demand for mobile application developers by employers. It is great to see you seizing the opportunity to provide this education for your students as well.

In reviewing your proposed curriculum, I can say that I believe you will be doing a very good job preparing your students for employment as well as preparing them to continue their studies with a BS in Information Technology should they so choose.

I look forward to our continued work together to provide the best possible opportunities for all our students. Please let me know if I can be of any additional help in getting this degree up and running.

Sincerely,

Prof. Stephen J. Zilora
Information Sciences and Technologies Department Chair

R·I·T   Rochester Institute of Technology

2/20/14

David Lawrence
Information and Computing Studies
National Technical Institute for the Deaf

Dear David

I am writing in support of NTID's proposed AAS in **Mobile Application Design and Development**. Due to my work with MAGIC's Mobile Zone initiative and in the Department of Interactive Games and Media I am conversant with the current state of the art in terms of current mobile development, right up to the work we've done in the last month or two to launch the AT & T Civic App Challenge today.

As a former adjunct in NTID's department of Applied Computing Technology (the predecessor to ITS) and throughout my career as an RIT faculty member I have taught and/or mentored Deaf computing students My most recent mentees are Motion Savvy team who are now funded members of the Leap Motion AXLR8R program and presenting at the AAS Emerging Researchers National Conference in STEM next week. I'll be joining the team and Dr. Buckley when they present to CISCO in San Jose in March.

The mobile development world is one of the most vibrant sectors of computing today and its great to see the curriculum your department has developed. I believe it will provide them with a solid, foundational understanding of the different aspects of design required for mobile development and give them the skills they need to develop on their own and/or move into the IST BS program.

Congratulations on a solid effort and I look forward to seeing your students engaging with us in the MAGIC Center.

Sincerely,

Stephen Jacobs
Associate Director, RIT Center for Media, Arts, Games, Interaction & Creativity (MAGIC)
Professor, Interactive Games and Media
Rochester Institute of Technology
152 Lomb Memorial Drive
Bldg 70
Rochester, NY 14623
sj@mail.rit.edu
585-278-6118. Cell

Marianne Gustafson

From:	James G. Miller (EMCS VP)
Sent:	Monday, February 24, 2014 5:25 PM
To:	Marianne Gustafson
Cc:	Scott Hooker
Subject:	RE: Concept Paper for AAS Mobile App Design & Development

Dear Marianne,

Thanks for sharing the concept paper for the proposed NTID AAS degree in Mobile App Design and Development.

The current projection of 10 incremental new students annually is a reasonable market expectation. I estimate that a few more than 10 could be achieved if desired. With annual intake of 10, the overall number of 27 by year 3 might be a little high given retention rates cited below.

Reviewing details of the program concept paper I noted: 1) that 5 semesters of full-time study will be required to meet degree requirements; 2) that most students will use this as a terminal degree; and 3) that persistence rates are projected at 90% for one year and 80% at graduation.

Please note that students using Tuition Assistance from NYS will be limited to 4 semesters of eligibility; Pell recipients will be limited to 6 semesters of eligibility; and transfer candidates though few in number will be deficient in general education credits in transferring into BS degree programs. TAP will be affected in semester 5; Pell should not be affected for students making satisfactory academic progress.

I trust this meets your needs. Let me know if you need anything more.

Sincerely,
Jim Miller

From: Marianne Gustafson
Sent: Wednesday, February 12, 2014 5:46 PM
To: James G. Miller (EMCS VP)
Subject: Concept Paper for AAS Mobile App Design & Development

Dr. Miller,

Chris Licata gave me the go-ahead to send you this penultimate version of the Concept Paper for the proposed NTID AAS degree program entitled, "Mobile App Design and Development." The final version, along with your certification regarding enrollment projections, is due to the Provost's office by Thursday February 27, 2014 so they can upload it for the four-week community vetting process.

Attached to the 6-page concept is the four-page NTID Cost Model. Enrollment expectations are described in Section VII of the concept paper and Projected Revenue from New Students is shown in Table 2 of the attachment.

Please let me know if you need further information in order to certify the enrollment projections.

Thanks so much.

Marianne

Information and Computing Studies
Mobile App Design and Development Associate Degree Program
Projected Expenditures For The Proposed Program
Table 1

	Year 1 AY15-16	Year 2 AY16-17	Year 3 AY17-18	Year 4 AY18-19	Year 5 AY19-20
Faculty Positions	$ 164,200	$ 227,100	$ 233,900	$ 240,900	$ 248,100
Staff Assistant	$ 1,800	$ 1,800	$ 1,900	$ 1,900	$ 2,000
Benefits	$ 66,000	$ 94,000	$ 99,000	$ 104,000	$ 110,000
Faculty	$ 232,000	$ 322,900	$ 334,800	$ 346,800	$ 360,100
Computer Charges	$ 14,600	$ 25,200	$ 30,500	$ 31,400	$ 32,400
Instructional Supplies	$ 3,000	$ 3,100	$ 3,200	$ 3,300	$ 3,400
Telephone	$ 1,500	$ 1,800	$ 2,000	$ 2,300	$ 2,600
Software Licenses	$ 1,200	$ 1,300	$ 1,400	$ 1,500	$ 1,600
Travel-Conferences	$ 1,500	$ 1,800	$ 2,000	$ 2,300	$ 2,600
Tuition Payments for RIT Credits	$ 30,700	$ 60,000	$ 70,500	$ 72,600	$ 74,700
Other	$ 52,500	$ 93,200	$ 109,600	$ 113,400	$ 117,300
Total	$ 284,500	$ 416,100	$ 444,400	$ 460,200	$ 477,400
New Resources	$ -	$ 81,800	$ 84,800	$ 88,000	$ 91,300

Information and Computing Studies
Mobile App Design and Development Associate Degree Prog,
Table 2
Projected Revenue From New Students

	Year 1 AY15-16	Year 2 AY16-17	Year 3 AY17-18	Year 4 AY18-19	Year 5 AY19-20
Enrollments Fall Semester	10	19	27	27	27
Enrollments Spring Semester	10	19	19	19	19
Total Semesters of Enrollment	20	38	46	46	46
Semester Tuition Rate	$ 7,094	$ 7,448	$ 7,821	$ 8,212	$ 8,623
Additional Tuition Revenue	$ 141,876	$ 283,043	$ 359,762	$ 377,750	$ 396,638
State Revenue	$0	$0	$0	$0	$0
Grand Total	$ 141,876	$ 283,043	$ 359,762	$ 377,750	$ 396,638

NTID tuition is fully applied to the program in this model. This is somewhat misleading as tuition is applied to the support of all academic and non academic program accessed by the students. This program does not fit into the Net Tuition Revenue Model used by the other RIT colleges. Tuition is subsidized by the Federal Appropriation and is therefore not cost related

Information and Computing Studies
Mobile App Design and Development Associate Degree Program

Table 3
Projected Capital Expenditures

	Year 1 AY15-16	Year 2 AY16-17	Year 3 AY17-18	Year 4 AY18-19	Year 5 AY19-20
Capital Facilities	$0	$0	$0	$0	$0
Equipment	$0	$0	$0	$0	$0
Total Capital Expenditures	$0	$0	$0	$0	$0

Additional equipment to support this program is not required. As with all programs there will be needs for exisiting equipment to be upgraded as technology develops. This expense will be supported through existing NTID policies and funded through current operating budgets.

New facilities, such as laboratories, will not be required.

Information & Computing Studies
Mobile App & Development Associate Degree Program
Table 4
NTID Financial Viability and Resources
NEW PROGRAM EXPENSES/REVENUE
ESTIMATES

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Total
Incremental Personnel		$ 58,000.00	$ 59,700.00	$ 61,500.00	$ 63,400.00	$ 242,600.00
Benefits		$ 23,800.00	$ 25,100.00	$ 26,500.00	$ 27,900.00	$ 103,300.00
Incremental Equipment						$ -
Space Renovation						$ -
F & E @ 33%						$ -
Expense		$ 81,800.00	$ 84,800.00	$ 88,000.00	$ 91,300.00	$ 345,900.00
Overhead*						$ -
Incremental Library Acquisitions						$ -
Incremental Space						$ -
Total Expense						$ -
Enrollment **	10.00	19.00	27.00	27.00	27.00	$ 110.00
Tuition @ 2014-2015 + 5%	$ 14,188.00	$ 14,897.00	$ 15,642.00	$ 16,424.00	$ 17,245.00	$ 78,396.00
Discount @ 33 %						$ -
Total Revenue	$ 141,876.00	$ 283,043.00	$ 359,762.00	$ 377,750.00	$ 396,638.00	$ 1,559,069.00
Total Rev. – Total Exp.	$ 141,876.00	$ 201,243.00	$ 274,962.00	$ 289,750.00	$ 305,338.00	$ 1,213,169.00

* College total cost per CHG/Direct Cost per CHG
** Incremental students as projected by EMCS

This table estimates major incremental program expenses and revenues for the purpose of cirricular review. The figures have not yet been reviewed by Finance & Adminstration Staff. Funding for the proposed program is not assured, and does not assure program funding.