SFU OFFICE OF THE VICE-PRESIDENT, ACADEMIC AND PROVC

MEMORANDUM

ATTENTION	Senate	**DATE**	May 1, 2012
FROM	Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP	**PAGES**	1/1
RE:	Faculty of Communication, Art and Technology: Full Program Proposal for a Graduate Certificate in Visual Analytics in the School of Interactive Arts and Technology (SCUP 12-06)		

At its April 11, 2012 meeting SCUP reviewed and approved the Full Program Proposal for a Graduate Certificate in Visual Analytics in the School of Interactive Arts and Technology within the Faculty of Communication, Art and Technology, effective Fall 2012.

Motion:

That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Graduate Certificate in Visual Analytics in the School of Interactive Arts and Technology within the Faculty of Communication, Art and Technology, effective Fall 2012.
encl.

c: S. DiPaolo
    F. Popowich

SFU

MEMO

Dean of
Graduate Studies

STREET ADDRESS
Maggie Benston
Student Services Centre
1100
Burnaby BC V5A 1S6
Canada

MAILING ADDRESS
8888 University Drive
Burnaby BC V5A 1S6
Canada

TO: SCUP	TEL
FROM Wade Parkhouse, Dean, Graduate Studies	
RE Visual Analytics Certificate **[GS2012.09]**	
CC Marek Hatala	
DATE March 28, 2012	

At its meeting of 5 March, 2012, the SGSC approved the following proposal for a
Visual Analytics (VA) Certificate and is forwarding it to SCUP for consideration:

Faculty of Communication, Art and Technology
School of Interactive Arts and Technology (IAT)   **[GS2012.09]**
Proposal for a Graduate Certificate in Visual Analytics
i) New course proposals:
    IAT 854-3 Visually Enabled Reasoning
    IAT 856-1 Visual Analytics Graduate Seminar

Senators wishing to consult a more detailed report of curriculum revisions
may do so by going to Docushare:
https://docushare.sfu.ca/dsweb/View/Collection-12682
If you are unable to access the information, please call 778-782-3168 or email
shelley_gair@sfu.ca.

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Proposal for a
GRADUATE CERTIFICATE
in
VISUAL ANALYTICS
at
Simon Fraser University

1 EXECUTIVE SUMMARY

The proposed Graduate Certificate in Visual Analytics builds upon SFU expertise in the cognitive and social sciences and visualization and computational technologies, focused by our internationally recognized success in Visual Analytics research. It continues SFU's history of innovative interdisciplinary education to create a cross-disciplinary research community that will support analytical innovation by graduate students from across the university. It bridges the interdisciplinary interaction design capabilities of the School of Interactive Arts and Technology and School of Communication, the breadth of scholarship and applications of academic units in the Faculty of Arts and Social Sciences, and the multidisciplinary science of mind of the proposed Cognitive Science Master of Arts program. It will support innovative use of VA approaches for programs in technology development offered by the Schools of Engineering Science and Computing Science in the Faculty of Applied Sciences and the application of Visual Analytics to topic areas in the Faculties of Education (e.g. educational technology), Business (e.g. MIS and Marketing), and Communications (e.g., Social Construction of Communication Technologies). Further applications are possible in the School of Criminology (e.g. Criminal Intelligence Analysis); the Department of Geography (e.g. Geographic Information Systems); and the Faculties of Environment (e.g. environmental monitoring and modeling) and Health Sciences (e.g. health informatics), and visual "e-science" research for academic units in the Faculty of Science.

Because Visual Analytics touches on so many fields, a graduate certificate will be the most effective way to support SFU graduate students to incorporate Visual Analytics methods into a broad range of disciplines and application areas.

2 PREAMBLE

Visual Analytics has been defined as "the science of analytical reasoning facilitated by the interactive visual interface." It focuses on the synergy between cognitive and social science research and innovations in the design of interactive information and communication technologies. Visual Analytics methods will enable human decision-makers and their organizations to better achieve societal objectives such as enhanced productivity and competitiveness in business, improved engineering and policy analysis, groundbreaking scientific research, enhanced public health and environmental planning, crime reduction and effective and efficient emergency management. Decision-makers in diverse fields each face challenges unique to their domains, however they have in common four analytical capabilities that they must develop:

- **To evaluate, analyze, and understand patterns of information from masses of archival and real-time data in a timely and effective manner.**
- **To manage increasingly complex and inter-related systems in business, engineering, government, science, health, and the environment.**
- **To create, evaluate, and implement innovative solutions to familiar and emerging problems.**
- **To operationalize their decisions within complex organizations and an increasingly interconnected world with a diversity of cultures, sectors, and relationships.**

Addressing these challenges will require the coordinated advancement of technological, cognitive, and social systems. New computational algorithms and models must be developed in step with the interactive visual interfaces that enable them to be effectively utilized by human decision-makers. A new breed of technologically sophisticated analyst must adapt and apply these new technologies in context of their discipline, knowledge domain, organization, and operational role. Organizations and even societies must evolve to better integrate new visual information systems into business, government, and social processes.

The proposed Graduate Certificate in Visual Analytics builds upon SFU expertise in the cognitive and social sciences and visualization and computational technologies, focused by our internationally recognized success in Visual Analytics research. It continues SFU's history of innovative interdisciplinary education to create a cross-disciplinary research community that will support analytical innovation by graduate students from across the university. It bridges the interdisciplinary interaction design capabilities of the School of Interactive Arts and Technology and School of Communication, the breadth of scholarship and applications of academic units in the Faculty of Arts and Social Sciences, and the multidisciplinary science of mind of the proposed Cognitive Science Master of Arts program. It will support innovative use of VA approaches for programs in technology development offered by the Schools of Engineering Science and Computing Science in the Faculty of Applied Sciences and the application of Visual Analytics to topic areas in the Faculties of Education (e.g. educational technology), Business (e.g. MIS and Marketing), and Communications (e.g., Social Construction of Communication Technologies). Further applications are possible in the School of Criminology (e.g. Criminal Intelligence Analysis); the Department of Geography (e.g. Geographic Information Systems); and the Faculties of Environment (e.g. environmental monitoring and modeling) and Health Sciences (e.g. health informatics), and visual "e-science" research for academic units in the Faculty of Science.

Because Visual Analytics touches on so many fields, a graduate certificate will be the most effective way to support SFU graduate students to incorporate Visual Analytics methods into a broad range of disciplines and application areas.

The proposed program will benefit from the focus on computational and mathematical analytics of the Interdisciplinary Research in the Mathematical and Computational Sciences (IRMACS) Centre's Modelling of Complex Social Systems (MoCSSy) Graduate Certificate program. The Visual Analytics Certificate program adds a pathway for students whose focus is on human analytical processes as they are performed by individuals, organizations, and society as a whole.

These processes clearly incorporate models and modelling, and some MoCSSy courses may also fulfill VA Certificate requirements.

3 PURPOSE OF GRADUATE CERTIFICATE

The Graduate Certificate will provide students an opportunity to learn within the framework of a novel interdisciplinary program that will enhance their achievement and encourage collaborative and integrative approaches to research of national importance. By providing formal recognition of the VA students' accomplishments, SFU will increase the students' academic potential and mobility.

3.1 Innovative Scholarship with Real-World Applications

Visual Analytics is a new and growing field of study with substantial industry and government interest and funding. A European Union 7th Framework Coordination Action ("VisMaster: Mastering the Information Age"), a US NSF Program (Foundations of Data And Visual Analytics") and a German Priority Program ("Scalable Visual Analytics") focus on Visual Analytics. New programs are beginning in Asia and the Pacific. Students with interdisciplinary training from the SFU VA certificate program will be in the position to apply for a greater variety of jobs, and have a stronger academic background to support them. Students will be encouraged to publish in high quality journals, and to participate and present research results at international conferences.

3.2 Enhanced employment opportunities for graduates

Leaders in industry and government increasingly recognize the role that Visual Analytics can play in improving performance. Certificate students with an MA or MSc in an applied field can be expected to have a strong competitive edge over other graduates in the job market. As part of the VA program, students are encouraged to work with industrial and government sponsors on applications of VA. This provides students a chance to apply their skill sets, and build a better understanding of the complexities of to real-world problems as well as contributing to innovative scholarly research. The MITACS ACCELERATE BC program will be an important aspect of this process, and they have agreed to coordinate with our program.

3.3 Increased Value to the Community

The focus on applications that meet societal needs will enable graduates of the VA program to contribute to Canada in many ways. Their accomplishments will provide visible evidence of the commitment of SFU to supporting the welfare of the community.

4 CERTIFICATE REQUIREMENTS

4.1 Participation in the VA Certificate

Graduate students may opt to participate in the VA certificate. All students intending to participate are strongly encouraged to discuss their intentions with their supervisory committee first. If appropriate, the supervisory committee may discuss the student's intention with the VA Managing Director and/or the VA Certificate Program Steering Committee prior to formally communicating to the VA Program their intention to participate.

4.2 Enrolment, Support, and Tracking

Prospective students must apply to Simon Fraser University for admission and meet the normal admission requirements for a graduate degree prior to undertaking the VA Graduate Certificate Program. The VA Certificate program does not allow direct admission.

Certificate students must be enrolled and in good standing in a graduate degree program at SFU, and must graduate in order to receive the Certificate. Qualified students should submit their registration information to the VA Certificate Program Steering Committee as early as possible. Upon registration they will be classified as a VA Certificate Student and placed on the mailing list for announcements of VA events such as lectures and special courses. Our close relationship with IRMACS will help to support our goal of presentation of seminars and course material between SFU campuses.

The VA Certificate Program is intended for graduate students who will utilize Visual Analytics methods for their thesis or other significant research projects. In order to better support students' application of Visual Analytics methods VA Certificate students who do not already have an affiliated faculty supervisor will be directed toward a VA affiliated faculty member who can advise them on the use of Visual Analytics in their research. This faculty member may serve as a co-advisor or active committee member.

The Visual Analytics Steering Committee will discuss with the Dean of Graduate Studies the best process for tracking students in the Certificate using SIMS, and then implement that process.

Students accepted into the VA Certificate Program are encouraged to discuss sources of funding and scholarships with the Program Director as well as with their supervisor.

4.3 Home Department Definition and Responsibilities

The department, school, or faculty to which a student is originally admitted shall be referred to as the student's *home department*. The student's home department is responsible for providing standard student administrative support (photocopying, computer access, graduate secretary access, etc.).

4.4 Program Structure

The graduate certificate combines the four key aspects of Visual Analytics: Cognition, Technology, Society, and Integration. Integration is realized in a practical sense through completion of a substantial research project using Visual Analytics methods, typically the student's thesis work or another significant research project. This falls under the jurisdiction of the student's department or school, and is thus outside of the scope of requirements for the VA Certificate. Support for integration is provided by the VA Certificate program however, through facilitating participation of the certificate committee members on supervisory committees and through the Visual Analytics seminar series.

The three area requirements are met by selecting four courses from the lists below, with at least one course from each of the three content areas. Other courses that achieve the same goals, e.g. special topics courses, can be proposed by departments or schools to the VA Certificate Committee. Students may also petition for approval of a course by the committee. Upon approval by the committee the course will be added to the list of approved courses in the appropriate category. A maximum of two courses can be from the student's home department.

4.5 Certificate Program Requirements

Four courses are required in addition to the graduate seminar, IAT 856. The courses must be chosen from at least two different Schools and must include at least one from each of the following three lists of courses:

I. **Cognitive Processes--** Courses fulfilling this requirement must cover the cognitive processes that underlie analytic practice, grounded in the practical application of VA technologies to support human cognitive processes.

    A. BUS 601-2 - Data and Decision-Making
    B. EDUC 892-4 - Cognitive Tools and Multimedia Learning
    C. IAT 854-3 - Visually Enabled Reasoning
    D. IAT 812-3 - Cognition, Learning and Collaboration

II. **Visual Analytics Technology--** Courses fulfilling this requirement examine the creation, selection, and customization of information systems in the student's discipline or area of interest. This includes data processing and modeling as well as interactive visualization.

    A. BUS 709-3 - Managing Information
    B. CMPT 721-3 - Knowledge Representation and Reasoning
    C. CMPT 767-3 - Visualization
    D. IAT 814-3 - Knowledge Visualization & Communication
    E. IAT 813-3 - Artificial Intelligence

III. **Social Systems--** Courses fulfilling this requirement examine the impact of advanced visual analytic technology on individuals, organizations, and society in order to determine how it can best be designed and introduced to support social and collaborative processes.

A. BUS 621-4 - Information Technology and Organizational Transformation
B. CMNS 815-5 - Social Construction of Communication Technologies
C. EDUC 893-4 - Organizational and Social Aspects of Learning Technology Design

4.6 VA Graduate Seminar Series and Workshops

A VA graduate seminar series, IAT 856-1, will provide an opportunity for students to discuss relevant literature, to present their own research ideas, and to critique proposals for VA projects. Students are expected to participate in this seminar each term, barring conflict with required courses or RA/TA responsibilities. Topical VA workshops may be organized from time to time by the VA Program. VA students are expected to participate in these VA events as their timetable permits. We will work with IRMACS to enable presentation of events across SFU campuses.

5 PROCESS AND TIMELINES

Assuming approval every step of the way, the next steps in the process will be as follows:
- Discussions with potential host departments, *fall 2009*
- Review and approval by faculty graduate program committees, *spring 2011*
- Review and approval by Senate Graduate Studies Committee (SGSC), *spring 2012*
- Review and Approval by Senate, *summer 2012*
- First VA Certificate Program students admitted, *fall 2012*

APPENDIX 1: COURSES

Existing Courses

For a list of existing courses, see section 4.5 (Certificate Program Requirements).

Proposed New Courses:

IAT 854
This course has been offered previously as IAT 885, Special Topics: Visually Enabled Reasoning, in Spring 2011. IAT 854 examines Visual Analytics from the perspective of human cognition. Readings focus on core issues in the cognitive science of human problem solving, learning, and collaboration with a focus on the use of external representations as cognitive aids. It is also a practicum in its use of visual analytic technologies: IN-SPIRE, Starlight, and Jigsaw as well as conventional statistical and mathematical analysis tools such as Matlab, R, and SAS.

Course Objectives
- Understand issues, methods, and findings in the cognitive science of human reasoning.
- Learn practical analytic reasoning skills facilitated by visual information systems.
- Prepare write-ups of lab analyses that address cognitive science theories and methods.

Learning Activities & Evaluation
The seminar component will focus on discussion of issues and methods in the emerging science of human reasoning with interactive visual information systems. In the practicum students will work as individual analysts and in teams addressing problems (e.g. from the NSF SEMVAST problem sets) using advanced analysis tools. Students will journal their analysis activities. They will write a final paper that integrates the scientific content and practicum components of the course.

IAT 856
The Visual Analytics Graduate Seminar aims to be a forum for the building of Visual Analytics (VA) community, for exposure to diversity of VA research work and method, for fostering understanding of VA disciplinary commonalities and differences. Visual Analytics is a strongly interdisciplinary program and the Graduate Seminar aims to reflect this by exposing students to a broad range of Visual Analytics approaches to research. Through this Graduate Seminar series, presentations by VA associated faculty, SFU non-VA associated faculty and outside visitors will be scheduled alongside presentations by students. Where possible, presentations by international visiting researchers will be integrated into the program. The emphasis is on a community of VA research which includes students.

Learning Activities & Evaluation:
Students will be evaluated on their participation in this course. Participation includes attendance at the weekly 60-90 minute presentations. Additionally, students will be required to make a presentation based on their own research and/or present a critique and comparison of presentations by others. This course will be graded on a satisfactory/unsatisfactory basis.

APPENDIX 2: SUPPORT

Principal VA Faculty
- Mark Blair (Psychology /Cognitive Science)
- John Dill (SIAT/ENSC))
- Brian Fisher (SIAT/Cognitive Science)
- Fred Popowich (Computer Science/Cognitive Science)
- Christopher Shaw (SIAT)
- Robert Woodbury (SIAT)

VA SFU Supporting Faculty
- Peter Anderson (CMNS)
- Ellen Balka (CMNS)
- Lyn Bartram (SIAT)
- Peter Borwein (IRMACS)
- Steve DiPaola (SIAT)
- Halil Erhan (SIAT)
- Diane Gromala (SIAT)
- Linda Harasim (CMNS)
- Veselin Jungic (IRMACS/Math)
- Jan Marontate (CMNS)
- John Nesbit (EDUC)
- Anoop Sarkar (CPSC)
- Richard Smith (CMNS)
- Ron Wakkary (SIAT)
- Kay C. Wiese (CPSC)
- Philip Winne (EDUC)

APPENDIX 3: MANAGEMENT FOR PROGRAM CHANGES AND FUNDING

Certificate Steering Committee and Structure

The Certificate Steering Committee consists of the
- Three members elected by and from the VA Principal Investigators, covering the major curriculum areas,
- A Chair elected by and from the VA Principal Investigators, and
- The VA Managing Director (ex-officio, advisory).

The term of office for all non-advisory members of the Certificate Steering Committee is three years. The Program Director is Chair of the Steering Committee.

Visual Analytics Principal Investigators

The VA Principal Investigators are
- Mark Blair (Psychology, Cognitive Science)
- John Dill (SIAT)
- Brian Fisher (SIAT)
- Fred Popowich (Computing Science, Cognitive Science)
- Christopher Shaw (SIAT)
- Robert Woodbury (SIAT)

The VA Principal Investigators are responsible for providing overall leadership and decision support for the VA program. This includes developing overall research directions for the program, liaising with University Deans and VPs to help promote the VA program at SFU, and selecting and hiring the Program Director and Managing Director for the VA program. Any regular SFU faculty member may apply and become a VA PI upon approval of the Certificate Committee.

The VA Program Director works closely with the VA Managing Director to ensure the day-to-day running of the VA program. This includes organizing VA symposiums, seeking new VA graduate students, and maintaining a high level understanding of all VA sub-projects. The VA Program Director is viewed as a short-term position; elected for a period of three years.

The initial VA Managing Director is Pamela Borghardt (IRMACS). The VA Managing Director works closely with the VA Program Director to ensure the day-to-day running of the VA program. The VA Managing Director is viewed as a long-term position.

Program Changes

Additions and changes to the list of qualifying certificate courses will be made by the VA Certificate Committee in consultation with the departments in which the courses are held. Graduate courses may not be offered every year. Students who need to take required courses that are not offered in the current year must contact the VA Program Director for suitable replacements.

Once the VA Certificate is established, it may become necessary or desirable to change the

requirements. Changes in course lists for each department must be approved by the VA Certificate Committee, the Graduate Chair of the affected department, and the Chair or Director of the affected department or School. Changes in requirements regarding the VA Graduate seminar series must be approved by the VA Certificate Committee. Bringing new departments into the VA Graduate Certificate program must be approved by the Certificate Committee, and the Graduate Chair and Chair or Director of the affected department or school, the appropriate Dean, and the Senate Graduate Studies Committee.

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SFU SIMON FRASER UNIVERSITY
DEAN OF GRADUATE STUDIES

New Graduate Course Proposal Form

▆▆▆▶ PROPOSED COURSE

Program (eg. ECON) IAT	Number (eg. 810) 854	Units (eg. 4) 3

Course Title (max 80 characters)
Visually Enabled Reasoning

Short Title (appears on transcripts, max 25 characters)
Visually Enabled Reasoning

Course Description for SFU Calendar   ☐ see attached document   ☐ Learning outcomes identified
Explores how interactive visual interfaces can help to shape human cognitive processes. It combines the study of visually-enabled reasoning as a cognitive science and the use of interactive visualization technologies such as IN-SPIRE, Starlight, and Jigsaw as well as conventional statistical and mathematical analysis tools that support human cognitive processes.

Available Course Components: ☐ Lecture   ☑ Seminar   ☐ Laboratory   ☐ Practicum   ☐ Online   ☐ _____

Grading Basis   ☑ Graded   ☐ Satisfactory/Unsatisfactory   ☐ In Progress/Complete

Prerequisites (if any)   ☐ see attached document
Registered graduate students from the School of Interactive Arts and Technology, or with permission of the instructor.

☐ This proposed course is combined with an undergrad course: Course number and units: _____
Additional course requirements for graduate students   ☐ See attached document (if this space is insufficient)

Campus at which course will be offered (check all that apply)   ☐ Burnaby   ☑ Vancouver   ☑ Surrey   ☐ GNW   ☐ _____

Estimated enrolment	Date of initial offering	Course delivery (eg. 3 hrs/week for 13 weeks)
8-15	2012 Sept	3 hrs/week for 13 weeks

Justification   ☐ See attached document
This course both supports the proposed Visual Analytics Graduate Certificate Program as well as strengthens current SIAT graduate offerings.

▆▆▆▶ RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course   ☐ information about their competency to teach the course is appended
Brian Fisher, Chris Shaw, Bernhard Riecke

Number of additional faculty members required in order to offer this course
0

Additional space required in order to offer this course   ☐ see attached document
0

Additional specialized equipment required in order to offer this course   ☐ see attached document
0

Additional Library resources required (append details)   ☐ Annually $_____   ☐ One-time $_____
0

■■■▶ PROPOSED COURSE *from first page*

Program (eg. ECON) IAT	Number (eg. 810) 854	Units (eg. 4) 3
Course title (max 80 characters) Visually Enabled Reasoning		

■■■▶ APPROVAL SIGNATURES

When a department proposes a new course it must first be sent to the chairs of each faculty graduate program committee where there might be an overlap in course content. The chairs will indicate that overlap concerns have been dealt with by signing the appropriate space or via a separate memo or e-mail (attached to this form).

The new course proposal must also be sent to the Library for a report on library resources.

Once overlap concerns have been dealt with, signatures indicate approval by the department, home faculty and Senate Graduate Studies Committee.

Other Faculties
The signature(s) below indicate that the Dean(s) or designate of other Faculties affected by the proposed new course support(s) the approval of the new course.

Name of Faculty	Signature of Dean or Designate	Date

Departmental Approval (non-departmentalized faculties need not sign)

Department Graduate Program Committee STEVE DIPAOLA	Signature	Date 1/24/12
Department Chair JOHN BOWES	Signature	Date 1/25/12

Faculty Approval
Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

Faculty Graduate Program Committee NAPEC TATALA	Signature	Date 1/25/2012

Senate Graduate Studies Committee Approval
SGSC approval indicates that the Library report has been seen, and all resource issues dealt with. Once approved, new course proposals are sent to Senate for information.

Senate Graduate Studies Committee WParkhouse	Signature WParkhouse	Date Mar 30/2

■■■▶ CONTACT

Upon approval of the course, the Dean of Graduate Studies office will consult with the department or school regarding other course attributes that may be required to enable the proper entry of the new course in the student record system.

Department / School / Program SIAT	Contact name STEVE DIPAOLA	Contact email sdipaola@sfu.ca

NOTE: These outlines are drafts and are subject to change.

Course Outline – 2012/2013 Academic Year

IAT 854-3: Visually Enabled Reasoning

School of Interactive Arts and Technology

Instructor: Brian Fisher, Chris Shaw, Bernhard Rieck

Location: SFU Surrey

Prerequisite: This course is open to registered graduate students from the School of Interactive Arts and Technology, or with permission of the instructor. The course assumes a moderate level of technical skill (use of computers, spreadsheets etc.) and the ability to read and understand scientific and technical papers

Course Description:
Interactive visual information systems are increasingly used to support human analysis and decision making. Areas as diverse as engineering, health, finance and policy making can benefit from a "science of analytical reasoning facilitated by the interactive visual interface". The use of these in analysis call for new standards for evidence, criteria for proof, and methods for building agreement about policies, plans and methods by which they can be implemented. An analytics of the visual image will include aspects of cognitive, perceptual and social sciences, computational and mathematical approaches to implementation of analytic technologies to support human cognitive processes, and a new body of design knowledge. This course explores how interactive visual interfaces can help to shape human cognitive processes. It combines the study of visually-enabled reasoning as a cognitive science and the use of interactive visualization technologies such as IN-SPIRE, Starlight, and Jigsaw as well as conventional statistical and mathematical analysis tools that support human cognitive processes. The course is intended to build common ground for collaboration on visual analytics for students in a range of disciplines. Students will present and discuss original research methods and findings from the literature (e.g. the IEEE Conference on Visual Analytics Science and Technology) and from their own work. The expectation is that students will engage in critical discussion of concepts and approaches that are utilized in visual analytics and related research areas

Courses Objectives:
- Understand core research issues, methodologies, and findings in the cognitive science of human analytic processes
- Learn practical analytic reasoning skills facilitated by visual analytic information systems
- Prepare focused write-ups of analytic processes that integrate and advance cognitive science theories and methods

Learning Activities & Evaluation:

The seminar component will focus on discussion of issues and methods in the emerging science of human reasoning with interactive visual information systems. In the practicum students will work as individual analysts and in teams addressing analytic problems (e.g. from SEMVAST) using advanced visual analysis tools. Students will journal their analysis activities. They will write a final paper that integrates the seminar and practicum components of the course

Evaluation: 50% final paper, 25% journal, 25% participation

15

Texts, Resources & Materials:

REQUIRED:

- Structured Analytic Techniques for Intelligence Analysis by Richards J. Heuer, Randolph H. Pherson and John McLaughlin
- Causal Models: How People Think about the World and Its Alternatives. S. Sloman, Oxford Press

RECOMMENDED:

- Human Reasoning and Cognitive Science. Keith Stenning & Michiel van Lambalgen, MIT Press
- How We Reason. Philip Johnson-Laird, Oxford Press

ONLINE:

- Illuminating the Path, a R&D Agenda for Visual Analytics J. Thomas and K. Cook
- Psychology of Intelligence Analysis. R. J. Heuer, CIA
- Analytic Pathologies, J. Cooper

SELECTED READINGS:

- Information Foraging Theory: Adaptive Interaction with Information. P. L. T. Pirolli, Oxford Press
- Tools for Innovation. Arthur B. Markman and Kristin L. Wood, Oxford Press
- Thinking With Data. Marsha C. Lovett and Priti Shah (Editors), Lawrence Erlbaum

Schedule

1. Intro to Va
2. Logic and problem solving
3. Text analysis 1 (INSPIRE)
4. Text analysis 2
5. Quant analysis (Tableau)
6. Quant analysis 2
7. Link analysis
8. Geographic analysis (Geotime)
9. Mixed---initiative systems

SFU SIMON FRASER UNIVERSITY
DEAN OF GRADUATE STUDIES

New Graduate Course Proposal Form

➤ PROPOSED COURSE

Program (eg. ECON) IAT	Number (eg. 810) 856	Units (eg. 4) 1

Course Title (max 80 characters)
Visual Analytics Graduate Seminar

Short Title (appears on transcripts, max 25 characters)
Visual Analytics Seminar

Course Description for SFU Calendar ☐ see attached document   ☐ Learning outcomes identified

Aims to be a presentation forum for the building of Visual Analytics (VA) community, for exposure to diversity of VA research work and method, for fostering understanding of VA disciplinary commonalities and differences.

Available Course Components: ☐ Lecture   ☑ Seminar   ☐ Laboratory   ☐ Practicum   ☐ Online   ☐ _____

Grading Basis   ☑ Graded   ☑ Satisfactory/Unsatisfactory   ☐ In Progress/Complete

Prerequisites (if any)   ☐ see attached document

Registered graduate students from the School of Interactive Arts and Technology, or with permission of the instructor.

☐ This proposed course is combined with an undergrad course: Course number and units: _____

Additional course requirements for graduate students   ☐ See attached document (if this space is insufficient)

Campus at which course will be offered (check all that apply)   ☐ Burnaby   ☑ Vancouver   ☑ Surrey   ☐ GNW   ☐ _____

Estimated enrolment	Date of initial offering	Course delivery (eg. 3 hrs/week for 13 weeks)
8-15	Sept 2012	3 hrs/week for 13 weeks

Justification   ☐ See attached document

This course both supports the proposed Visual Analytics Graduate Certificate Program as well as strengthens current SIAT graduate offerings.

➤ RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course   ☐ information about their competency to teach the course is appended
Brian Fisher, Chris Shaw

Number of additional faculty members required in order to offer this course
0

Additional space required in order to offer this course   ☐ see attached document
0

Additional specialized equipment required in order to offer this course   ☐ see attached document
0

Additional Library resources required (append details)   ☐ Annually $_____   ☐ One-time $_____
0

▶ PROPOSED COURSE *from first page*

Program (eg. ECON) IAT	Number (eg. 810) 856	Units (eg. 4) ⟋
Course title (max 80 characters) Visual Analytics Graduate Seminar		

▶ APPROVAL SIGNATURES

When a department proposes a new course it must first be sent to the chairs of each faculty graduate program committee where there might be an overlap in course content. The chairs will indicate that overlap concerns have been dealt with by signing the appropriate space or via a separate memo or e-mail (attached to this form).

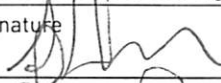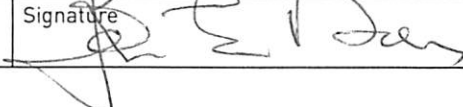The new course proposal must also be sent to the Library for a report on library resources.

Once overlap concerns have been dealt with, signatures indicate approval by the department, home faculty and Senate Graduate Studies Committee.

Other Faculties
The signature(s) below indicate that the Dean(s) or designate of other Faculties affected by the proposed new course support(s) the approval of the new course.

Name of Faculty	Signature of Dean or Designate	Date

Departmental Approval (non-departmentalized faculties need not sign)

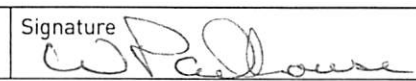| Department Graduate Program Committee STEVE DIPAOLA	Signature	Date 1/24/12
Department Chair JOHN BOWES	Signature	Date 1/25/12

Faculty Approval
Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

Faculty Graduate Program Committee MAREK HATALA	Signature	Date 1/25/12

Senate Graduate Studies Committee Approval
SGSC approval indicates that the Library report has been seen, and all resource issues dealt with. Once approved, new course proposals are sent to Senate for information.

Senate Graduate Studies Committee WPasthouse	Signature WPasthouse	Date Mar 30/12

▶ CONTACT

Upon approval of the course, the Dean of Graduate Studies office will consult with the department or school regarding other course attributes that may be required to enable the proper entry of the new course in the student record system.

Department / School / Program	Contact name STEVE DIPAOLA	Contact email sdipaola@sfu.ca

Course Outline – 2012/2013 Academic Year

IAT 856-1: Visual Analytics Graduate Seminar

School of Interactive Arts and Technology

Instructor: Brian Fisher, Chris Shaw

Location: SFU Surrey

Prerequisite: This course is open to registered graduate students from the School of Interactive Arts and Technology, graduate students accepted to the VA Certificate Program, or students with permission of the instructor. It is recommended that this course be taken during the first year of graduate study.

Course Description:
The Visual Analytics Graduate Seminar aims to be a forum for the building of Visual Analytics (VA) community, for exposure to diversity of VA research work and method, for fostering understanding of VA disciplinary commonalities and differences. Visual Analytics is a strongly interdisciplinary program and the Graduate Seminar aims to reflect this by exposing students to a broad range of Visual Analytics approaches to research. Through this Graduate Seminar series, presentations by VA associated faculty, SFU non-VA associated faculty and outside visitors will be scheduled alongside presentations by students. Where possible, presentations by international visiting researchers will be integrated into the program. The emphasis is on a community of VA research which includes students.

Topics depend on the scheduling of presentations. A presentation schedule will be determined closer to the beginning of the semester. At times, the sequence may shift to accommodate visitors.

Courses Objectives:
In this course, you will:
- Become familiar with a range of VA research and associated faculty interests, allowing you a better basis on which to choose committee members.
- Be exposed to the work of VA researchers beyond the University, drawn from regional and international venues, to keep you informed about related research to the VA program.
- Be provided an opportunity for presentation of your own research, at whatever stage you may find yourself.
- Be aware of the diversity of research areas, methodologies and practices relevant to the intersecting areas that make up VA locally and internationally.

Learning Activities & Evaluation:
Students will be evaluated on their participation in this course. Participation includes attendance at the weekly 60-90 minute presentations. Additionally, students will be required to make a presentation based on their own research and/or present a critique and comparison of presentations by others. This course will be graded on a satisfactory/unsatisfactory basis.

Texts, Resources & Materials:
To be supplied by presenters where relevant and necessary.

From: Ivana Niseteo <iniseteo@sfu.ca>
Subject: Re: new course proposals IAT 854 & IAT 856
Date: 31 January, 2012 12:05:10 PM PST
To: mhatala@sfu.ca
Cc: Todd Mundle <tmundle@sfu.ca>, Shane Plante <spa61@sfu.ca>

Dear Dr. Hatala,

I have reviewed two course proposals for which you requested library reports:
IAT 854 - *Visually Enabled Reasoning*
IAT 856 - *Visual Analytics Seminar*

and have determined that no additional library resources are required to support them. They are now added to the Library Course Assessments page http://www.lib.sfu.ca/collections/course-assessments , and this will be adequate proof of library sign-off.

Best regards,
Ivana

Ivana Niseteo, MA, MLIS
Collections Librarian
Liaison Librarian for Linguistics, French, Humanities, French Cohort in Arts
Bennett Library, Simon Fraser University
Tel: 778.782.6838 | Fax: 778.782.6926 | iniseteo@sfu.ca

From: "Marek Hatala" <mhatala@sfu.ca>
To: spa61@sfu.ca
Cc: "Marek Hatala" <mhatala@sfu.ca>
Sent: Wednesday, 25 January, 2012 9:40:04 AM
Subject: new course proposal needing library check

Hi Shane,

attached are two course proposals as mentioned in my voicemail. Please froward appropriately or confirm that no additional resources are required. IAT 854 has been taught previously as a special topics, IAT 856 is a seminar.

We need this by feb 6 the latest.

Thank you,

Dr. Marek Hatala
:: Associate Professor and Acting Associate Dean for Graduate Studies

SFU Connect   **sheilagh@sfu.ca**

Re: IAT 854 and 856

From : Marek Hatala <mhatala@sfu.ca>   Wed, Feb 22, 2012 09:14 AM
Subject : Re: IAT 854 and 856   📎6 attachments
    To : Sheilagh MacDonald <sheilagh@sfu.ca>
    Cc : Marek Hatala <mhatala@sfu.ca>

Hi,

I have handed those to you last time in hard copy. The emails are attached. These are all
I received. Wade last time said: "no response, no conflict".

Here are the two course forms. I changed the prerequisites to include the visual analytics.
IAT856 form has also a change against the last version - unchecked "Graded".

Marek

On 2012-02-20, at 4:45 PM, Sheilagh MacDonald wrote:

> Hi Marek,
> Just a reminder that SGSC will need a library report and your email to fgsc-
> list requesting that your fellow Associate Deans review your new courses and
> indicate if they have overlap concerns. We'll need copies of any responses as
> well.
>
> Sheilagh

From: "Marek Hatala" <mhatala@sfu.ca>

To: "Sheilagh MacDonald" <sheilagh@sfu.ca>
Cc: "Marek Hatala" <mhatala@sfu.ca>, "Mary Ann Pope" <mpope@sfu.ca>
Sent: Monday, February 20, 2012 10:35:44 AM
Subject: Re: IAT 856

Hi Sheilagh,

I do not like the idea of co-requisites as we will have students from many different programs and it is simply not possible to list all the possibilities. As the certificate will have only students who are graduate students (no direct admits) I do not see the problem as their home programs will ensure that they are properly registered.

There is no way we can put some credit count on this seminar either - no academic content.

As such I want to keep the course proposal as it is.

We have an FGSC meeting starting at 11am and we will be approving Dual MA with CUC. I hope to have the cleaned up documents to you by Wednesday morning.

Marek

On 2012-02-20, at 9:49 AM, Sheilagh MacDonald wrote:

> Hi Marek,
> do you have some feedback on the O credit crse in Visual
> Analytics-IAT 856. Do you have a co-requisite, something that
> would ensure the student doesn't "fall off the face of the earth"
> when it comes to student loans, UPasses, etc. It messes them up
> in so many ways.
>
> You might want to talk to Mary Ann about options. Her
> suggestion is to have a co-requisite that they be enrolled in any of
> the courses related to Visual Analytics.
>
> We need to sort this before the next SGSC meeting.
>
> --
> Sheilagh MacDonald
> Secretary, Dean of Graduate Studies
> sheilagh@sfu.ca
>
> phone: 778 782 4255
> fax: 778 782 3080

From: Marek Hatala <mhatala@sfu.ca>
Subject: new course proposals, please check for overlap
Date: 25 January, 2012 9:31:33 AM PST
To: fgsc-list@sfu.ca
Cc: Marek Hatala <mhatala@sfu.ca>

2 Attachments, 876 KB

Dear associate deans,

Attached are two new course proposals from FCAT. Please check with your programs for substantial overlap.

Note: these proposals are to support the visual analytics certificate. Both Computing and Cognitive Science (and others others) are part of the proposal so I would expect an overlap in interest from these two programs. There should be minimal overlap in content.

The plan is to have these discussed together with VA certificate in the next SGSC meeting. I would appreciate if you could respond to me and Sheilagh by Monday Feb 6.

Thank you,
Marek

iat854NewC...pdf (498 KB)   iat856NewC...pdf (378 KB)

Dr. Marek Hatala
:: Associate Professor and Acting Associate Dean for Graduate Studies
:: School of Interactive Arts and Technology, Faculty of Communication, Art & Technology
:: SIMON FRASER UNIVERSITY, 250-13450 102 Ave., Surrey, BC V3T 0A3, Canada
:: Email: mhatala@sfu.ca, Web: http://www.sfu.ca/~mhatala/
:: Phone: 1.778.782.7431, Fax: 1.778.782.7478

From: Duncan Knowler <djk@sfu.ca>
Subject: Re: new course proposals, please check for overlap
Date: 30 January, 2012 3:41:44 AM PST
To: Marek Hatala <mhatala@sfu.ca>

No overlap with Environment.

Duncan Knowler
Associate Professor, School of Resource and Environmental Management
and Associate Dean, Faculty of Environment
Simon Fraser University
Burnaby, BC
Canada V5A 1S6
tel 778/782-3421 (REM) or 8827 (FENV)
fax 778/782-4968 (REM) or 8788 (FENV)

----- Original Message -----
From: "Marek Hatala" <mhatala@sfu.ca>
To: fgsc-list@sfu.ca
Cc: "Marek Hatala" <mhatala@sfu.ca>
Sent: Wednesday, 25 January, 2012 09:31:33
Subject: new course proposals, please check for overlap

Dear associate deans,

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Note: these proposals are to support the visual analytics certificate. Both Computing and
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I would appreciate if you could respond to me and Sheilagh by Monday Feb 6.

Thank you,
Marek

Dr. Marek Hatala
:: Associate Professor and Acting Associate Dean for Graduate Studies
:: School of Interactive Arts and Technology, Faculty of Communication, Art & Technology
:: SIMON FRASER UNIVERSITY, 250-13450 102 Ave., Surrey, BC V3T 0A3, Canada
:: Email: mhatala@sfu.ca, Web: http://www.sfu.ca/~mhatala/
:: Phone: 1.778.782.7431, Fax: 1.778.782.7478

From: Margo Moore <mmoore@sfu.ca>
Subject: Re: new course proposals, please check for overlap
Date: 9 February, 2012 9:47:31 PM PST
To: Marek Hatala <mhatala@sfu.ca>

Hi Marek:

Sorry for the delay - No overlap with Health Sciences.

Regards,
Margo

mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
Margo Moore, Ph. D.
Professor
Department of Biological Sciences
Associate Dean, Education
Faculty of Health Sciences

Simon Fraser University
8888 University Drive
Burnaby BC V5A 1S6
Canada

T: 778-782-3441
F: 778-782-3496
E: mmoore@sfu.ca

On 25-Jan-12, at 9:31 AM, Marek Hatala wrote:

| <iat856NewCourse.pdf>