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| For Academic Affairs and Research Use Only | |
| CIP Code: |  |
| Degree Code: |  |

**Reconfiguration of Existing Degree Program Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Hong Zhou | 10/23/2019 |   **Department Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **COPE Chair (if applicable)** |
| |  |  | | --- | --- | | Amanda Lambertus | 10/23/2019 |   **Department Chair:** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Head of Unit (If applicable)** |
| |  |  | | --- | --- | | John Hershberger | 10/25/2019 |   **College Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Undergraduate Curriculum Council Chair** |
| |  |  | | --- | --- | | Lynn Boyd | 10/25/2019 |   **College Dean** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Vice Chancellor for Academic Affairs** |

1. **Proposed Program Title**

Master of Science in Statistics

1. **Contact Person** (Name, Email Address, Phone Number)

Amanda Lambertus: [alambertus@astate.edu](mailto:alambertus@astate.edu), 870-680-8136

Hong Zhou; [hzhou@astate.edu](mailto:hzhou@astate.edu); 870-680-8120

1. **Proposed Starting Date**

Fall 2020

1. **Is there differential tuition requested?** *If yes, please fill out the New Program/Tuition and Fees Change Form.*

Yes.

**Bulletin Changes**

|  |
| --- |
| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Follow the following guidelines for indicating necessary changes.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

***\*For new programs, please insert copy of all sections where this is referenced.\****

Page 43 of 2019-20 Graduate Bulletin:

**Master of Science (M.S.)**

|  |
| --- |
| Biology |
| Chemistry |
| College Student Personnel Services |
| Computer Science  —Cyber Security  —Data Science  —High Performance Computing |
| Disaster Preparedness and Emergency Management |
| Early Childhood Services |
| Environmental Sciences |
| Exercise Science |
| Mathematics |
| Media Management |
| Molecular Bioscience |
| Psychological Science |
| Sport Administration |
| Statistics |
| Strategic Communication  —Information Technology Law and Policy |

Page 75 of 2019-20 Undergraduate Bulletin:

**Master of Science (M.S.)**

|  |
| --- |
| Biology |
| Chemistry |
| College Student Personnel Services |
| Computer Science  —Cyber Security  —Data Science  —High Performance Computing |
| Disaster Preparedness and Emergency Management |
| Early Childhood Services |
| Environmental Sciences |
| Exercise Science |
| Mathematics |
| Media Management |
| Molecular Bioscience |
| Psychological Science |
| Sport Administration |
| Statistics |
| Strategic Communication  —Information Technology Law and Policy |

Page 255 of 2019-20 Graduate Bulletin:

**PROGRAMS OF STUDY**

The College of Sciences and Mathematics offers work leading to the Master of Arts degree in biology; to the Master of Science degree with majors in biology, chemistry, environmental sciences, ~~and~~ mathematics, and statistics; to the Master of Science in molecular biosciences; and to the Master of Science in Education degree with majors in biology, chemistry, and mathematics.

Page 278 of 2019-20 Graduate Bulletin:

**Program of Study for the Master of Science in Statistics**

**ADMISSION REQUIREMENTS**

Students seeking admission into the Master of Science degree program in Statistics, must meet the admission requirements of Graduate Admissions and the specific program requirements. Students may not take 6000-level courses for credit until all undergraduate deficiencies have been removed.

For unconditional admission, academic proficiency must be established through satisfaction of either of the following admission selection criteria:

* A minimum cumulative undergraduate grade point average of 3.00 on a 4.00 scale or the score of the combined verbal and quantitative sections of the Graduate Record Examination (GRE) meets the department requirement.

For conditional admission, academic proficiency must be established through satisfaction of either of the following admission selection criteria:

* The total undergraduate GPA is 2.75 on a 4.00 scale or the score of the combined verbal and quantitative sections of the Graduate Record Examination (GRE) meets the department requirement.

**Statistics**

Master of Science

|  |  |
| --- | --- |
| **University Requirements:** | |
| See Graduate Degree Policies for additional information (p. 40) |  |
| **Program Requirements:**  Minimum 21 hours of 6000-level coursework excluding thesis. | Sem. Hrs. |
| STAT 6653, Data Analysis I **AND**  STAT 6663, Data Analysis II | 6 |
| STAT 6703, Statistical Analysis I **AND**  STAT 6713, Statistical Analysis II | 6 |
| **Select one of the following programming courses:**  STAT 5483, Statistical Methods Using R  STAT 6623, Statistical Methods with SAS programming  STAT 6833, Biostatistics | 3 |
| **Electives (select four of the following):**  STAT 5463, Probability and Statistics II  STAT 5483, Statistical Methods Using R  STAT 6433, Time Series Analysis  STAT 6613, Nonparametric Statistics  STAT 6623, Statistical Methods with SAS programming  STAT 6643, Multivariate Analysis  STAT 6673, Design of Experiments  STAT 6723, Probability  STAT 6833, Biostatistics | 12 |
| Approved electives in related area | 6 |
| **Total Required Hours:** | **33** |

**LETTER OF NOTIFICATION – 11**

**RECONFIGURATION OF EXISTING DEGREE PROGRAMS**

**(Consolidation or Separation of Degrees to Create New Degree)**

\*Please include the documents to be submitted found throughout this LON at the end of the form.

1. Institution submitting request: Arkansas State University
2. Contact person/title: Dr. Amanda Lambertus, Chair of Mathematics and Statistics Department
3. Title(s) of degree programs to be consolidated/reconfigured:

Master of Science in Mathematics

1. Current CIP Code(s)/Current Degree Code(s): 27.0101
2. Proposed title of consolidated/reconfigured program: Master of Science in Statistics
3. Proposed CIP Code for new program: 27.0501
4. Proposed Effective Date: Fall 2020
5. Reason for proposed program consolidation/reconfiguration:

*(Indicate student demand (projected enrollment) for the proposed program and document that the program meets employer needs)*

The reason for reconfiguring the M.S. in Mathematics degree to create a M. S. in Statistics is to allow students in the mathematical science as well as other students majoring in science, engineering, business, and the social science to acquire the formal training in applied statistics to meet increasing demands for data analysis in the work force. The courses will be pulled from the existing MS mathematics and Statistics courses in the Graduate Bulletin.

The Bureau of Labor Statistics projects that jobs for “statisticians/statistical analysts” will grow by 30% between 2018 and 2028, much faster than the average for all occupations. The corporations, non-profit organizations, governmental agencies, educational and research institutes, health care, etc. will need these workers to analyze the increasing volume of digital and electronic data, so called “Big Data”.

<https://www.bls.gov/ooh/math/mathematicians-and-statisticians.htm>

In fact, many “statisticians/statistical analysts” work under the titles as data scientist, quantitative analyst, business analyst, statistical researcher, financial analyst, economist, actuarial analyst, biostatistician, etc.

According the 2001-2017 Workforce Analysis report recently conducted by Arkansas Department of Higher Education, the professional- and knowledge-intensive industries offered the most pay and career growth, such as the qualified statisticians/statistical analysts working in finance and insurance, health care and assistance, professional, scientific and technical services, information, etc. For example, some statisticians/statistical analysts working as “Economists” are among the highest earners.

<https://static.ark.org/eeuploads/adhe/Workforce-Analysis.pdf>

**The projected enrollment will be 15 students per year.**

1. Provide current and proposed curriculum outline by semester.

*For undergraduate programs, please also fill out 8-semester plan at end of document.*

*Indicate total semester credit hours required for the proposed program. Underline new courses and provide new course descriptions. (If existing courses have been modified to create new courses, provide the course name/description for the current/existing courses and indicate the related new/modified courses.) Identify required general education core courses with an asterisk.*

**Current M.S. in Mathematics:**

|  |  |
| --- | --- |
| **University Requirements:** | |
| See Graduate Degree Policies for additional information (p. 39) |  |
| **Program Requirements:**  Minimum 21 hours of 6000-level coursework excluding thesis. | Sem. Hrs. |
| **Select three of the following two-semester sequences:**  MATH 6823, Functions of a Real Variable I AND  MATH 6833, Functions of a Real Variable II  MATH 6853, Functions of a Complex Variable I AND  MATH 6863, Functions of a Complex Variable II  MATH 6603, Abstract Algebra I AND  MATH 6613, Abstract Algebra II  STAT 6653, Data Analysis I AND  STAT 6663, Data Analysis II  MATH 6753, Point Set Topology AND  MATH 6623, Differential Geometry  MATH 6873, Numerical Analysis I AND  MATH 6883, Numerical Analysis II  STAT 6703, Statistical Analysis I AND  STAT 6713, Statistical Analysis II | 18 |
| MATH/STAT Electives | 12 |
| Approved electives in related area | 6 |
| Sub-total | 36 |
| **Total Required Hours:** | **36** |

**Proposed M.S. in Statistics:**

|  |  |
| --- | --- |
| **University Requirements:** | |
| See Graduate Degree Policies for additional information (p. 40) |  |
| **Program Requirements:**  Minimum 21 hours of 6000-level coursework excluding thesis. | Sem. Hrs. |
| STAT 6653, Data Analysis I AND  STAT 6663, Data Analysis II | 6 |
| STAT 6703, Statistical Analysis I AND  STAT 6713, Statistical Analysis II | 6 |
| **Select one of the following programming courses:**  STAT 5483, Statistical Methods Using R  STAT 6623, Statistical Methods with SAS programming  STAT 6833, Biostatistics | 3 |
| **Electives (select four of the following):**  STAT 5463, Probability and Statistics II  STAT 5483, Statistical Methods Using R  STAT 6433, Time Series Analysis  STAT 6613, Nonparametric Statistics  STAT 6623, Statistical Methods with SAS programming  STAT 6643, Multivariate Analysis  STAT 6673, Design of Experiments  STAT 6723, Probability  STAT 6833, Biostatistics | 12 |
| Approved electives in related area | 6 |
| **Total Required Hours:** | **33** |

**Proposed M.S. in Statistics Curriculum by semester:**

|  |  |
| --- | --- |
| **Fall 2020** |  |
| STAT 6653, Data Analysis I  STAT 6613, Nonparametric Statistics  STAT 5483, Statistical Methods Using R | 3  3  3 |
| **Spring 2021** |  |
| STAT 6663, Data Analysis II  STAT 6623, Statistical Methods with SAS programming  STAT 6643, Multivariate Analysis | 3  3  3 |
| **Summer 2021** |  |
| STAT 6723, Probability | 3 |
| **Fall 2021** |  |
| STAT 6703, Statistical Analysis I  STAT 6673, Design of Experiments | 3  3 |
| **Spring 2022** |  |
| STAT 6713, Statistical Analysis II  STAT 6433, Time Series Analysis  STAT 6833, Biostatistics | 3  3  3 |
| **Summer 2022** |  |

1. Provide program budget. Indicate amount of funds available for reallocation. *See end of document.*
2. Provide current and proposed organizational chart. *See end of document.*
3. Institutional curriculum committee review/approval date: Enter text...
4. Are the existing degrees offered off-campus or via distance delivery?

No.

1. Will the proposed degree be offered on-campus, off-campus, or via distance delivery?

No.

1. Identify mode of distance delivery or the off-campus location for the proposed program.

N/A

1. Provide documentation that proposed program has received full approval by licensure/certification entity, if required.

*(A program offered for teacher/education administrator licensure must be reviewed/approved by the Arkansas Department of Education prior to consideration by the Coordinating Board; therefore, the Education Protocol Form also must be submitted to ADHE along with the Letter of Notification).*

N/A

1. Provide copy of e-mail notification to other institutions in the area of the proposed program and their responses; include your reply to the institutional responses. *See end of document.*

N/A

1. List institutions offering similar program and identify the institutions used as a model to develop the proposed program.

University of Arkansas, Fayetteville (M.S. in Statistics and Analytics (STAN))

1. Provide scheduled program review date (within 10 years of program implementation).

Academic year 2028 -- 2029

1. Provide additional program information if requested by ADHE staff.

Enter text...

President/Chancellor Approval Date: Click here to enter a date.

Board of Trustees Notification Date: Click here to enter a date.

Chief Academic officer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: Enter date.

Name (printed): Click here to enter text.

**8-Semester Plan**

(**referenced in #9** - **Undergraduate Proposals Only)**

*Instructions: Please identify new courses in italics*.

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| **Arkansas State University-Jonesboro Degree:**  **Major:**  **Year:** | | | | | | | | |
| Students requiring developmental course work based on low entrance exam scores (ACT, SAT, ASSET, COMPASS) may not be able to complete this program of study in eight (8) semesters. Developmental courses do not count toward total degree hours. **Students having completed college level courses prior to enrollment will be assisted by their advisor in making appropriate substitutions. In most cases, general education courses may be interchanged between semesters.** A minimum of 45 hours of upper division credit (3000-4000 level) is required for this degree. | | | | | | | | |
| **Year 1** | | | |  | **Year 1** | | | |
| **Fall Semester** | | | |  | **Spring Semester** | | | |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Year 2** | | | |  | **Year 2** | | | |
| **Fall Semester** | | | |  | **Spring Semester** | | | |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Year 3** | | | |  | **Year 3** | | | |
| **Fall Semester** | | | |  | **Spring Semester** | | | |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Year 4** | | | |  | **Year 4** | | | |
| **Fall Semester** | | | |  | **Spring Semester** | | | |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Total Jr/Sr Hours \_\_\_ Total Degree Hours \_\_\_** | | | | | | | | |
| **Graduation Requirements:** | | | | | | | | |

**Program Budget**

**(referenced in # 10)**

Provide program budget. Indicate amount of funds available for reallocation.

The program is a reconfiguration of the Master of Science in Mathematics. All courses required for the Master of Science in Statistics are in the Graduate Bulletin and are offered regularly (See a sample of Proposed MS in Statistics Curriculum by semester in #9).

**Organizational Chart**

**(referenced in # 11)**

Provide current and proposed organizational chart. Include where the proposed program will be housed (department/college).

2019-2020 Organizational Chart for the MS Statistics Program

Arkansas State University Jonesboro

**Written Notification to Other Institutions**

**(referenced in # 17)**

This should include a copy of written notification to other institutions in area of proposed program and responses

Enter text...

**Student Learning Outcomes**

Provide outcomes that students will accomplish during or at completion of this reconfigured degree. Fill out the following table to develop a continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

**University Outcomes**

Please indicate the university-level student learning outcomes for which this new program will contribute. Please complete the table by adding program level outcomes (PLO) to the first column, and indicating the alignment with the university learning outcomes (ULO). If you need more information about the ULOs, go to the [University Level Outcomes Website](http://www.astate.edu/a/assessment/student-learning-outcomes/files/ULOs%20for%20Website2.pdf).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **ULO 1: Creative & Critical Thinking** | **ULO 2: Effective Communication** | **ULO 3: Civic & Social Responsibility** | **ULO 4: Globalization & Diversity** |
| **PLO 1** | **X** |  |  |  |
| **PLO 2** | **X** |  |  |  |
| **PLO 3** | **X** |  |  |  |
| **PLO 4** |  | **X** |  |  |
| **PLO 5** |  | **X** |  |  |

***Note: Best practices suggest 4-7 outcomes per program; minors would have 1 to 4 outcomes.***

|  |  |
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| **Outcome 1** | **Statistical Knowledge --ADVANCED CONTENT**  M.S. Statistics graduates will explain and use advanced statistical theory and content knowledge. |
| Assessment Procedure Criterion | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Which courses are responsible for this outcome? | STAT 5463. Probability and Statistics II  STAT 6433. Time Series Analysis  STAT 6613. Nonparametric Statistics  STAT 6643. Multivariate Analysis  STAT 6653. Data Analysis I: Regression Analysis  STAT 6663. Data Analysis II: Analysis of Variance (ANOVA)  STAT 6673. Design of Experiments  STAT 6703. Statistical Analysis I  STAT 6713. Statistical Analysis II  STAT 6723. Probability |
| Assessment  Timetable | Data collected and reviewed every year. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

|  |  |
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| **Outcome 2** | **Statistical Practices – PRACTICAL EXPERIENCES**  M.S. Statistics graduates will design studies, use graphical and other means to explore data, build and assess statistical models, employ a variety of formal inference procedures. |
| Assessment Procedure Criterion | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Which courses are responsible for this outcome? | STAT 5483. Statistical Methods with R  STAT 6433. Time Series Analysis  STAT 6613. Nonparametric Statistics  STAT 6623. Statistical Methods with SAS Programming  STAT 6643. Multivariate Analysis  STAT 6653. Data Analysis I: Regression Analysis  STAT 6663. Data Analysis II: Analysis of Variance (ANOVA)  STAT 6673. Design of Experiments  STAT 6703. Statistical Analysis I  STAT 6713. Statistical Analysis II  STAT 6833. Biostatistics |
| Assessment  Timetable | Data collected and reviewed every year. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

|  |  |
| --- | --- |
| **Outcome 3** | **Statistical Practices – APPLICATION EXPERIENCES**  M.S. Statistics graduates will draw appropriate conclusions from the analysis and apply statistical methods to real world problem, assess their appropriateness. |
| Assessment Procedure Criterion | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Which courses are responsible for this outcome? | STAT 5463. Probability and Statistics II  STAT 5483. Statistical Methods with R  STAT 6433. Time Series Analysis  STAT 6613. Nonparametric Statistics  STAT 6623. Statistical Methods with SAS Programming  STAT 6643. Multivariate Analysis  STAT 6653. Data Analysis I: Regression Analysis  STAT 6663. Data Analysis II: Analysis of Variance (ANOVA)  STAT 6673. Design of Experiments  STAT 6833. Biostatistics |
| Assessment  Timetable | Data collected and reviewed every year. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

|  |  |
| --- | --- |
| **Outcome 4** | **Statistical Practices – SOFTWARE KNOWLEDGE**  M.S. Statistics graduates will be familiar with professional statistical software and other appropriate tools for data exploration, cleaning, validation, analysis, communication. |
| Assessment Procedure Criterion | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Which courses are responsible for this outcome? | STAT 5483. Statistical Methods with R  STAT 6433. Time Series Analysis  STAT 6613. Nonparametric Statistics  STAT 6623. Statistical Methods with SAS Programming  STAT 6643. Multivariate Analysis  STAT 6653. Data Analysis I: Regression Analysis  STAT 6663. Data Analysis II: Analysis of Variance (ANOVA)  STAT 6673. Design of Experiments  STAT 6833. Biostatistics |
| Assessment  Timetable | Data collected and reviewed every year. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

|  |  |
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| **Outcome 5** | **Statistical Practices – COMMUNICATION PRACTICES**  M.S. Statistics graduates will interact with and communicate with collaborators to understand their needs and effectively discuss results and conclusions through technical writing, presentations and visualizations. |
| Assessment Procedure Criterion | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Which courses are responsible for this outcome? | STAT 5463. Probability and Statistics II  STAT 5483. Statistical Methods with R  STAT 6433. Time Series Analysis  STAT 6613. Nonparametric Statistics  STAT 6623. Statistical Methods with SAS Programming  STAT 6643. Multivariate Analysis  STAT 6653. Data Analysis I: Regression Analysis  STAT 6663. Data Analysis II: Analysis of Variance (ANOVA)  STAT 6673. Design of Experiments  STAT 6833. Biostatistics |
| Assessment  Timetable | Data collected and reviewed every year. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

*Please repeat as necessary.*