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| The Hong Kong Statistical Society Examination Office,  c/o HKU School of Professional and Continuing Education,  Rm 313, 3/F, Admiralty Centre, 18 Harcourt Rd, Hong Kong. Tel: (852) 3761-1121                Fax: (852) 2527-0489 Email: [exam@hkss.org.hk](mailto:exam@hkss.org.hk)      Website: <http://www.hkss.org.hk> | **HONG KONG STATISTICAL SOCIETY** |

# APPLICATION FOR ACADEMIC ASSESSMENT - HIGHER CERTIFICATE

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| Membership  Category | | 🞎 Full  Member | | | 🞎 Student  Member | | | | | |  | | | | | | |
| Title | | \* Mr/Mrs/Miss/Ms/Other | | | | | HKID No. Please specify if other document | | | | | | | |  | | |
| Surname | |  | | | | | Other Names | | | | |  | | | | | |
| Date of Birth | |  | | | | | Email 🞎# | | | | |  | | | | | |
| Address | |  | | | | | | | | | | | | | | | |
| Telephone | |  | | Mobile Phone | | | | |  | | | | | Fax | | |  |
| Academic / Professional Qualifications (use separate sheet if insufficient space) | | | | | | | | | | | | | | | | | |
|  | Qualification | | Subject(s) Taken | | | Grade | | Year | | Awarding Body | | | | | | Documentary proof of relevant qualification attached see Note 3 | |
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| ***\*\* Please complete the Appendix by matching the subject(s) you have taken with the 2017 Higher Certificate syllabus*** | | | | | | | | | | | | | | | | | |
| Payment Method see Note 2 | | 🞎 Attached crossed cheque No: | | | | 🞎 Attached bank draft No: | | | | | | | 🞎 Attached original bank receipt for deposited amount | | | | |
| For acknowledgement of receipt of this form by the Society, you are required to enclose in addition a self-addressed stamped envelope. Please indicate whether acknowledgement is required: 🞎 Yes, a self-addressed envelope is enclosed 🞎 No | | | | | | | | | | | | | | | | | |

#: Please tick the box if you want to receive the notification letter of the assessment result by email.

Notes for filling in this form:

1. The main purpose the academic assessment services provided by the Hong Kong Statistical Society is to facilitate application of professional membership of the Society. In case any qualification is assessed to be equivalent to certain level of the 2017 examination organised by the Society, such assessment should not be regarded as a proof of additional academic qualification.
2. If you wish to apply for academic assessment, please fill in and return this form.
3. You are advised to enclose with it as much supporting evidence as possible. You must provide photocopy of transcript and/or certificates/diplomas. Do not send any originals. You must in any case provide a detailed breakdown of your course(s), showing clearly the statistical and mathematical units you have studied. Detailed syllabuses should be submitted. If you have previously been assessed by the Hong Kong Statistical Society (or by the Royal Statistical Society), please provide documentary proof of all previous assessment(s).
4. On receipt of the information, an assessment will be made and you will be notified accordingly.
5. Personal data provided will be solely used for the purpose of application, and in this connection the data will be handled by the HKSS and other authorized organizations or agencies only.
6. Complete each item in BLOCK LETTERS and use BALL PEN only.

Charges:

1. A non-refundable administration fee of $400 for each application will be charged when you submit this application form. Exact amount should be paid by crossed cheque or bank draft made payable to “Hong Kong Statistical Society Limited” or by depositing into the Society’s HSBC bank account (A/C number: 110-479482-002). The crossed cheque or bank draft or the original bank receipt should be submitted together with the application form. No cash will be accepted.
2. Applicants will be notified of the assessment results by mail or email. If it is assessed that the qualification possessed by applicants is equivalent to certain level of the 2017 examination organised by the Society, the applicants may choose to submit further fees for obtaining a documentary proof for the assessment at the following scale:

Certificate of Academic Assessment fee

a) Ordinary certificate : Modular form $200 per module

b) Higher certificate : Modular form $250 per module

c) Graduate diploma : Modular form $350 per module

1. Fees mentioned in this form are subject to review/adjustment.

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| Signature |  | Date |  |

**Appendix**

**HIGHER CERTIFICATE IN STATISTICS**

**MODULE 1: Data collection and interpretation**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Summarising and interpreting data**  Frequency distributions. Numerical and graphical forms of presentation and statistical interpretation.  Scatter diagrams, time charts, stem and leaf diagrams, histograms, bar charts, pie charts, frequency and cumulative frequency curves, boxplots (box and whisker plots), dotplots.  Summary statistics for measures of location, variability and skewness. |  |
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| **Surveys**  Target and study populations. Sampling frames. Problems arising in the collection of data.  Censuses, sample surveys and routine collection of data at intervals of time. |  |
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| Design of questionnaires and forms for collecting data.  Personal and telephone interviews, postal enquiries, pilot enquiries.  Problems of non-response, bias among interviewers, question bias, non-sampling errors. |
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| Simple random sampling. Uses and limitations. Estimators for means, totals and proportions and the variances of these estimators. |
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| Use of other practical methods of sampling: systematic sampling, cluster sampling, quota sampling, stratified random sampling and multi-stage sampling. |
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| **Exploratory analysis**  Candidates should be prepared to examine a set of data, to choose and carry out suitable methods of analysis, to answer questions from non-statistical users and to present the analysis and conclusions in the form of a short report. The techniques required may be of the simplest kind, e.g. plotting, grouping, transforming or calculating from the data. Candidates will be expected to use box-plots and other similar graphical displays. |  |
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| **Report writing**  Candidates should be prepared to produce a well-ordered, well-reasoned argument in a style suitable for a designated readership. (This readership could be, for example, non-statistical colleagues, managers, or users of official reports.) Candidates will be expected to make use of graphical methods to summarise data and identify unusual features. |  |
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| **Interpretation of published data** |

**MODULE 2: Probability models**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Probability**  Definitions of probability: equally likely outcomes; relative frequency; degrees of belief. Addition and multiplication of probabilities, conditional probability, statistical independence. Bayes' theorem. |  |
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| **Distributions**  Random variables. Discrete and continuous probability distributions. Probability mass function, probability density function, cumulative distribution function. Simple theory of elementary probability distributions, including discrete uniform, Bernoulli, binomial, Poisson, geometric, negative binomial, hypergeometric, Normal, exponential, gamma and continuous uniform. |  |
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| **Properties of distributions**  Expectation and variance; their general properties and values for standard distributions. |  |
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| Distributions, means and variances of sums of independent and identically distributed random variables and simple functions, such as *aX + b*. Linear combinations of independent Normally distributed variables. |
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| Statement and use of central limit theorem for independent, identically distributed random variables with finite variance.  Use of Normal approximations, including those for binomial and Poisson distributions. |

**MODULE 3: Basic statistical methods**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Inference**  Sample and population. Concept of a sampling distribution. Standard error. |  |
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| Point and interval estimates. Construction and interpretation of confidence limits. |
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| Hypothesis tests, test statistic, one- and two-sided tests.  Significance level. Type I and II errors. Power as 1–*P*(type II error). |
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| Use of Normal, *t*, χ2 and *F* distributions in testing and interval estimation.  Paired and unpaired two-sample tests. |
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| Power curves. |
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| The 2 goodness-of-fit test of standard distributions to observed data. |
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| Analysis of two-way contingency tables; χ2 test for association. |
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| McNemar’s test. |
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| **Non-parametric methods**  Use of non-parametric and distribution-free significance tests for paired and unpaired data: sign test, Wilcoxon rank sum test (Mann-Whitney *U* test), Wilcoxon signed-rank test. |  |

**MODULE 4: Linear models**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Correlation**  Product-moment correlation (Pearson). Rank correlation – Spearman’s coefficient. Calculation and interpretation. |  |
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| **Design of experiments**  Reasons for experimentation, causality.  Principles of replication and randomisation, completely randomised design. |  |
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| **Regression**  Simple linear regression. Least squares estimation.  Multiple linear regression – concepts, interpretation of computer output, inference for regression coefficients using estimates and estimated standard errors from computer output.  Analysis of variance for regression models.  Calculation and interpretation of the multiple correlation coefficient (coefficient of determination). |  |
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| Simple cases of transforming to linearity. |
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| **Analysis of variance**  One-way analysis of variance. |  |
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| Inference for means and for differences in means. |

**MODULE 5: Further probability and inference**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| Bivariate distributions Simple bivariate discrete distributions. Joint, conditional and marginal distributions: probability mass function, expectation and variance. Covariance and correlation. |  |
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| Simple bivariate continuous distributions. Joint, conditional and marginal distributions: probability density function, expectation and variance. Covariance and correlation. |
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| The bivariate Normal distribution. |
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| **Generating functions**  Probability and moment generating functions.  Use to find expectations and variances. Use to establish the distribution of sums of random variables. |  |
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| **Inference**  The likelihood function. |  |
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| Estimation of a single parameter of a distribution using the method of moments and the method of maximum likelihood. |
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| Properties of point estimators. Range, unbiasedness, consistency. Efficiency and relative efficiency. |
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| Calculation of approximate variance of a maximum likelihood estimator using second derivative of log likelihood. |

**MODULE 6: Further applications of statistics**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Design and analysis of experiments**  Principles of design including randomisation, blinding, pairing and blocking. |  |
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| Randomised block designs. Latin squares. |
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| Factorial treatment structure with two factors. Advantages of factorial experimentation. Diagrammatic explanation of interaction.  Two-way analysis of variance. |
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| Residuals and their use in checking assumptions. |
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| **Multiple regression** |  |
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| Least squares estimation for multiple regression. |
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| Regression through the origin. |
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| Use of backwards elimination in multiple regression. |
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| Polynomial regression. |
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| Use of indicator variables to model factors or qualitative variables. |
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| Residuals and their use in checking assumptions. |
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| **Quality control and acceptance sampling**  Charts for mean and range for Normal data. Charts for proportions. |  |
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| Cusum charts. |
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| Attribute sampling. Single and double sampling schemes. |

**MODULE 7: Time Series and Index Numbers**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Time series** |  |
| Decomposition of time series into trend, cycles, seasonal variation and residual (irregular) variation.  Estimation of trend using regression or moving averages.  Examination of seasonal terms in time series decompositions. Seasonal adjustment using regression or moving averages.  Elementary forecasting methods: exponential smoothing and Holt-Winters.  Introduction to ARIMA models.  Examination and interpretation of residuals from fitted models.  Interpretation of computer output. |
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| **Index numbers** |  |
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| **Introduction to index numbers**  Index numbers and their uses. Simple price relatives, Laspeyres and Paasche. Relationship between Laspeyres and Paasche; and the relative merits of each. Further index numbers – Törnqvist, Walsh, Fisher and Geometric Laspeyres. Index aggregation. |
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| **Deflation**  Why deflation is used and how it works; what makes a good deflator; how deflation is carried out. |
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| **Re-basing**  Why, when and how re-basing is done. |
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| **Chain linking**  Chain linking of simple price relatives, and chain linking using Laspeyres. |
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| **Use of index numbers** |

**MODULE 8: Survey Sampling and Estimation**

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| **Syllabus** | **Please indicate below the matching subjects / courses that you have taken** |
| **Populations and frames**  Target and study populations. Types of frames available, uses and sources of error. |  |
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| **Sampling methods**  Non-probability methods, haphazard sampling, quota sampling.  Simple random sampling, stratified random sampling (with equal, proportional and optimal allocation), cluster and multi-stage sampling, systematic sampling. |
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| **Simple and stratified random sampling**  Uses, limitations, applications to different data types, practical examples.  Estimates of totals, means and proportions, construction of confidence intervals.  Neyman and optimal allocation, use to reduce variance. |
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| **Calibration techniques for estimation**  Ratio and regression methods. Use of supplementary information. |  |
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| **Practical problems in planning and conducting surveys**  Choice of sampling method and estimators to be used in a survey, trade-off between bias and variance. Discussion of sampling problems in an actual survey, recommendations for improvement using practical examples. |  |

- End -