THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1972

General Comments and Courses

The Statistics Department is concerned with teaching and research in mathematical statistics, econometrics, probability theory, and also computer science. Unlike the situation in other Australian Universities the Department is responsible for teaching in these areas throughout the University and consequently caters for students with diverse backgrounds and interests. The semester system was introduced in 1972 largely on the grounds that the flexibility offered by teaching in semester units provided the most efficient means of meeting these varied demands. Another innovation was the division of the first year intake into two groups according to their background in school mathematics. Students with NSW Higher School Certificate 2S level mathematics or equivalent took Statistics A01 in the first semester and Statistics A02 in the second. Students with weaker preparation were required to take the mathematical methods course Statistics A03 before proceeding to Statistics A01 which was offered in both semesters. Whilst some minor problems arose with the semesterisation of first year teaching on balance the innovations appear to have been successful and the department intends to retain the present course structure.

Research by members of the Department was mainly in the fields of pure and applied probability (particularly limit theorems, branching processes, and characteristic functions), multivariate analysis, econometric time series, picture processing and pattern recognition, adaptive control, numerical methods and interactive systems. The Doctor of Science degree was awarded to Dr.C.C.Heyde and Dr.E.Seneta completed a book on *Non negative matrices*, which is to be published by Allen and Unwin, London in 1973. Professor Heathcote continued as Editor of *The Australian Journal of Statistics*.

ARGC grants for 1973 were awarded to Dr.Jarvis, Professor Heathcote, and Drs. Heyde and Seneta.

Undergraduates showed little interest in participating in the administration and work of the department although informal staff-student contact continued at a high level.

Enrolments and examination results

Total enrolment at 30 April 1972 showed little change from the previous year. Details of examination results are shown on pages 5, 6, 7 and 8. Comparative failure rates for students attempting the final examination are given on page 2.

Failure Rates, %

	Stats I	Stats II (Pass plus Honours)	Stats III (Pass plus Honours)	Operational Research	Computer Science I	Computer Science II
1967	33	29	0	–	–	–
1968	23	26	36	27	–	–
1969	18	25	6	9	–	–
1970	15	17	7	15	–	–
1971	18	20	8	3	7	–
1972	17	15	3	17	15	11

The figures for 1972 were drawn from those semester units most closely approximating the old full year units. Evidence from the 1972 results indicates that the overall picture is not significantly changed. However perusal of the detailed 1972 figures in the appendix shows that there is a marked difference between results in units offered in the first semester and in the second semester. Students gaining admission to the second semester units generally performed much better than the aggregate first semester intake.

Both Final Honours students obtained H2A.

Graduate students

One Ph.D. and one M.Sc. were conferred on students for theses successfully completed within the department in 1972. Another Masters thesis is with examiners and it is expected that two other Masters students will submit early in 1973. Mr.J.R.Leslie, a Ph.D. student, is currently working in Moscow on an Exchange Scholarship with Moscow State University. Of the seven graduate students two were enrolled for the Ph.D. and five for Masters degrees. In addition there is one staff candidate for the Ph.D.

Staff

Professor and Head of Department	–	C.R.Heathcote, B.A.(W.Aust.), M.A.(Melb.), Ph.D.
Professor	–	R.D.Terrell, B.Ec.(Adel.), Ph.D.
Readers	–	R.P.Byron, M.Ec.(W.Aust.), Ph.D.(Lond.)
	–	C.C.Heyde, M.Sc.(Syd.), Ph.D., D.Sc.

Staff (contd.)

Senior Lecturers   -   R.A.Jarvis, B.Eng.(W.Aust.), Ph.D.(W.Aust.)

                     -   S.John, B.Sc.(Trav.), M.Sc.(Kerala),
                             Ph.D.(Indian Stat.Inst.)

                     -   J.H.T.Morgan, B.A.(Cantab.), M.Sc.(Case
                             Inst.Tech.)

                     -   E.Seneta, M.Sc.(Adel.), Ph.D.

                     -   P.Winer, B.Sc.(Rand)

Lecturers   -   A.Cantoni, B.Eng.(W.Aust.), Ph.D.(W.Aust.)

                     -   P.N.Creasy, B.Sc.(Adel.)

                     -   D.F.Nicholls, B.Sc.(New Eng.), Ph.D.

                     -   T.J.Valentine, B.Ec.(Syd.), M.A.(Princeton),
                             Ph.D.(Princeton) (From 9.8.72.)

Senior Tutor   -   A.D.Hall, B.Ec.(Adel.), M.Ec.

Tutors   -   Helen L.Anderson, B.Sc.(Queensland)

                     -   A.Victoria Peterson, SCB(MIT), M.Sc.(Caltech.),
                             Ph.D.(Caltech.)

Programmers   -   Patricia N.McCarter, B.Sc.(W.Aust.)

                     -   A.R.Pagan, B.Ec.(Queensland), Ph.D.

Research Assistant   -   Ann Spurr, B.Com.(Melb.)

Publications

Byron, R.P. "Limited information using the Newton solution",
        Australian Economic Papers (June 1972), 112-118.

Byron, R.P. "Testing for misspecification in econometric systems
        using full information", International Economic Review, 13
        (3), (1972), 745-756.

Cantoni, A.** "A novel phase-locked loop", Proceedings of Institute
        of Radio and Electronic Engineers, 33 (4), (1972), 144-145.

Cantoni, A. "Curve fitting with piecewise linear functions",
        Proceedings of Institute of Radio and Electronic Engineers,
        33 (9), (1972), 417-423.

Cantoni, A. "A programmable diode-function generator", Proceedings
        of Institute of Radio and Electronic Engineers, 33 (10),
        (1972), 476-479.

** Based on work done prior to joining this University.

Heathcote, C.R. "A test of goodness of fit for symmetric random
          variables", <u>Australian Journal of Statistics</u>, 14 (2),
          (1972), 172-181.

Heathcote, C.R. and Pitman, J.W.[*] "An inequality for characteristic
          functions", <u>Bulletin of the Australian Mathematical
          Society</u>, 6 (1), (1972), 1-10.

Heyde, C.C. "Martingales: a case for a place in the statisticians
          repertoire", <u>Australian Journal of Statistics</u>, 14 (1),
          (1972), 1-9.

Heyde, C.C. and Leslie, J.R. "On the influence of moments on
          approximations by portion of a Chebyshev series in central
          limit convergence", <u>Zeitschrift fur Wahrscheinlichkeitstheorie</u>,
          21, (1972), 255-268.

Heyde, C.C. and Seneta, E. "The simple branching process, a turning
          point test and a fundamental inequality: a historical note on
          I.J.Bienaymé", <u>Biometrika</u>, 59 (3), (1972).

Heyde, C.C. and Seneta, E. "Estimation theory for growth and
          immigration rates in a multiplicative process", <u>Journal of
          Applied Probability</u>, 9, (1972), 235-256.

John, S. "The distribution of a statistic used for testing
          sphericity of normal distributions", <u>Biometrika</u>, 59 (2),
          (1972), 169-173.

Morgan, J.H.T. "Bayesian inference", in <u>Optimisation</u>, edited by
          R.S.Anderssen, L.S.Jennings and D.M.Ryan, University of
          Queensland Press, (1972), 60-68.

Scott, D.J.[*] "An invariance principle for reserved metric spaces",
          <u>Zeitschrift fur Wahrscheinlichkeitstheorie</u>, 20, (1971), 117-128.

Seneta, E. "Population projection variances and path analysis",
          <u>Journal of the American Statistical Association</u>, 67, (1972),
          617-619.

Anderssen, R.S.[1] and Seneta, E. "A simple statistical estimation
          procedure for Monte Carlo inversion in geophysics",
          <u>Pure and Applied Geophysics</u>, 91, (1971), 5-13.

Anderssen, R.S.[1] and Seneta, E. "A simple statistical estimation
          procedure for Monte Carlo inversion in geophysics II:
          Efficiency and Hempel's paradox", <u>Pure and Applied
          Geophysics</u>, 96, (1972), 5-14.

Hannan, E.J.[2] and Terrell, R.D. "Time series regression with linear
          constraints", <u>International Economic Review</u>, 13, (1972), 189-200.

---

[*] Former member. Based on work done while a member of the Department.

[1] Member of Computer Centre.

[2] Member of Statistics Department, RSSS.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

Subject or unit		Enrolled as at 30/4/72	Percentage of Number Enrolled			Percentage of Number Sitting					
			Sitting	Wastage (2-3)	Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail
A01	No.	242	212*	30	44	6	18	33	–	111	44
	%	100	87.6	12.4	18.2	2.8	8.5	15.6		52.4	20.8
A03	No.	95	80	15	18	3	11	8	–	40	18
	%	100	84.2	15.8	18.9	3.8	13.8	10.0		50.	22.5
B01	No.	76	63	13	13	–	–	–	10	40	13
	%	100	82.9	17.1	17.1				15.9	63.5	20.6
B01H	No.	17	16	1	1	3	2	4	–	6	1
	%	100	94.1	5.9	5.9	18.8	12.5	25.0		37.5	6.3
C01	No.	13	13	0	1	–	–	–	3	10	0
	%	100	100	0	7.7				23.1	76.9	0
C01H	No.	5	5	0	0	2	2	–	–	1	0
	%	100	100	0	0	40.0	40.0			20	0
C03	No.	36	33	3	9	0	2	4	6	12	9
	%	100	91.7	8.3	25.0	0	6.1	12.1	18.2	36.4	27.3

* Does not include M. Ag. Dev. Ec. (Prelim.) Students.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE

FIRST SEMESTER

Subject or unit		Enrolled as at 30/4/72	Sitting	Wastage (2-3)	Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail
		Percentage of Number Enrolled				Percentage of Number Sitting					
BO1	No.	164	154	10	24	4	34	32	–	60	24
	%	100	93.9	6.1	14.6	2.6	22.1	20.8		39	15.6
CO1	No.	36	28	8	4	–	–	–	8	16	4
	%	100	77.8	22.2	11.1				28.6	57.1	14.3
CO1H	No.	14	14	0	0	2	5	5	–	2	0
	%	100	100	0	0	14	36	36		14.3	0

	Enrolled (as at 30 April 1972)	Sitting	Results
Final Honours	2	2	H2A, H2A
Masters Qualifying	1	0	Withdrew
Masters Degree	5	2	1 M.Sc. awarded
			1 under examination (14 Dec.1972)
Ph.D.	3	1	1 Ph.D. awarded

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

Subject or unit		Enrolled as at 31.8.72	Percentage of Number Enrolled			Percentage of Number Sitting					
			Sitting	Wastage	Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail
AO1	No	130	114	16	30	3	11	18	–	52	30
	%	100	87.7	12.3	23.1	2.6	9.6	15.8		45.6	26.3
AO2	No.	156	152**	4	6	6	13	23	–	104	6
	%	100	97.4	2.6	3.8	3.9	8.6	15.1		68.4	3.9
BO2	No.	32	32	0	5	–	–	–	6	21	5
	%	100	100	0	15.6				18.8	65.6	15.6
BO2H	No.	10	6	4	0	1	3	1		1*	0
	%	100	60	40	0	16.7	50.0	16.7		16.7	0
BO3	No.	20	15	5	1	–	–	–	1	13	1
	%	100	75.0	25.0	5				6.7	86.7	6.7
BO3H	No.	5	5	0	0	2	3	–	–	0	0
	%	100	100	0	0	40	60			0	0
CO2	No.	12	12	0	1	–	–	–	3	8	1
	%	100	100	0	8.3				25.0	66.7	8.3
CO2H	No.	4	4	0	0	2	–	2	–	0	0
	%	100	100	0	0	50.0		50.0		0	0
CO4	No.	25	24	1	2				8	14	2
	%	100	96.0	4.0	8.0				33.3	58.3	8.3
CO4H	No.	6	6	0	0	1	3	2	–	0	0
	%	100	100	0	0	14.3	42.9	28.6		0	0

* This student was recorded as having passed at the ordinary (and not honours) level.

** Does not include M.Ag.Dev.Ec. (Prelim.) students.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE

SECOND SEMESTER

		Percentage of Number Enrolled				Percentage of Number Sitting					
Subject or unit		Enrolled as at 31.8.72	Sitting	Wastage (2-3)	Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail
BO2	No.	112	111	1	15	4	10	26	–	56	15
	%	100	99.1	0.9	13.4	3.6	9.0	23.4		50.5	13.5
CO2	No.	18	18	0	3	–	–	–	4	11	3
	%	100	100	0	16.7				22.2	61.1	16.7
C O2H	No.	4	4	0	1	2	0	1	–	0	1
	%	100	100	0	25.0	50.0	0	25.0		0	25.0
CO3	No.	8	8	0	0	–	–	–	4	4	0
	%	100	100	0	0				50.0	50.0	0
CO3H	No.	3	3	0	0	1	1	1	–	0	0
	%	100	100	0	0	33.3	33.3	33.3		0	0

8 1