

THE AUSTRALIAN NATIONAL UNIVERSITYFACULTY OF ECONOMICSDEPARTMENT OF STATISTICSANNUAL REPORT 1975General Comments and Courses

The research and teaching program of the Statistics Department is concerned with mathematical statistics, econometrics, probability theory, operational research and computer science. As this means that the department covers areas which in many Universities would be found in three or four separate departments the department has experienced low numbers in later year classes. This is of course to be expected in the formative years of new study areas but it may become a difficult problem for the Statistics Department should the University face a period of very slow growth.

An innovation in teaching technique was the use of a variant of the so-called Keller Plan of self paced instruction in the main second year unit Statistics B01. The salient features of this approach are that formal lecturing and examining is kept to a minimum with students completing the unit by passing a sequence of tests on segments of the course. The innovation was deemed successful and will be continued in 1976. It is believed that this method of teaching increases the student's interest and comprehension but generally at the cost of additional time on the part of both students and staff.

Preliminary discussions were held with statisticians from I.A.S., C.S.I.R.O., and the Bureau of Statistics on the desirability of introducing a course-work Masters degree in statistics. The reaction was generally favourable and it is proposed to proceed with detailed planning in 1976 with a view to introducing the course in 1977. The course will be open to Honours graduates of I or IIA standing and will generally aim to provide courses appropriate to students who wish to pursue a career as consulting statisticians.

The development of undergraduate econometric courses within the Department has been directed towards the provision of a major sequence of study in this area and in 1976 students will be offered such a sequence for the first time. Almost all students enrolling in the Masters of Economic Coursework Program participated in at least one postgraduate econometrics course. The sizeable group of students from that program who elected to specialize in such units within this Department in 1975 completed work of high quality.

The department has supported the creation of a position of Fellow for Dr R.B. Stanton to be held jointly in the Computer Centre and in Computer Science. The joint appointment begins on 1st Jan. 1976 and will be reviewed in the latter part of 1977.

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, non-standard maximum likelihood, changing parameter regression, non-linear estimation methods, time dependent systems of equations, econometric model building and specification testing, picture processing and pattern recognition, adaptive control numerical methods and interactive systems.

A.R.G.C. Grants for 1976 were awarded to Dr Valentine and Professor Terrell. Dr Valentine has also been awarded a Reserve Bank Fellowship in Economic Policy for 1976. He will work in the Economics Department, R.S.S.S. for the period (Aug. '76 to Aug. '77) he holds this fellowship.

The Departmental Committee met formally several times in the later part of 1975. To allow this Committee an independent voice at Faculty (and also at present on the Board) a Deputy Chairman, Dr Valentine, has been elected to conduct Departmental Committee meetings. It is too early to assess the value to staff and students of this Committee but it is significant that at its last meeting the Departmental Committee thought it necessary to encourage the formation of liaison committees in all units within the Department.

Enrolments and Examination Results

Total enrolments at 30th April 1975 showed divergent movements for each segment of the Department. There was a 2% decrease in undergraduate Statistics units whereas postgraduate enrolments increased by 83%. In Computer Science there was an increase of 15.8% in undergraduate enrolments and a 50% increase in postgraduate numbers.

A table of comparative failure rates for students attempting final examinations is presented for the period 1967-1975 below.

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
1973	16	12	10	10	17	9
1974	17	16	8	16	12	6
1975	11	10	7	13	13	8

The figures for 1972, 1973, 1974 and 1975 were drawn from those semester units most closely approximating the old full year units.

It does seem that lower failure rates, particularly in the Statistics units, have occurred in 1975. This is undoubtedly partly a result of a more selective intake and a greater proportion of full-time students, however, it also may represent a change resulting from greater variety in methods of examining students.

The Final Honours students in Statistics and Computer Science achieved four H1's and one H2B and one student has been allowed to proceed to his 2nd part-time year in the Honours degree.

Graduate Students

There are 14 students enrolled for higher degrees; there are four for the Ph.D. and six for the Masters degree in Statistics and one for the Ph.D. and three for the Masters degree in Computer Science.

Staff

- Professor, Head of Department - R.D. Terrell, B.Ec.(Adel.), Ph.D.
and Dean of Faculty
- Professor - C.R. Heathcote, B.A.(W.Aust.),
M.A.(Melb.), Ph.D.
- Readers - R.P. Byron, M.Ec.(W.Aust.),
Ph.D.(Lond.)
- C.C. Heyde, M.Sc.(Syd.), Ph.D., D.Sc.
(to 15.8.75.)
- E. Seneta, M.Sc.(Adel.), Ph.D.
- 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.)
- B.P. Molinari, B.Eng.(W.Aust.), Ph.D.(Cantab.)
- J.H.T. Morgan, B.A.(Cantab.), M.Sc.(Case
Inst. Tech.)
- D.F. Nicholls, B.Sc.(New Eng.), Ph.D.
- R.B. Stanton, B.Eng.(NSW), Ph.D.(NSW)
- T.J. Valentine, B.Ec.(Syd.), M.A.
(Princeton), Ph.D.(Princeton)
- P. Winer, B.Sc.(Rand)
- Lecturers - D.C. Chant, M.Sc.(Lond.), Ph.D.
- P.N. Creasy, B.Sc.(Adel.)
- A.R. Pagan, B.Ec.(Q'ld), Ph.D.
- Lecturing Fellow - A.J. Hurst, B.Sc. B.E.(Adel.)
- Senior Tutor/Temporary
Lecturer - P.D. Feigin, B.Sc.(Melb.)
- Tutors - R.R. Ewin, B.Sc.(Mon.)
- D.A. Hawking, B.Sc.
- Irene L. Romanow, B.Sc.(Adel.)
- Temporary Tutor - J.D. Rickard, B.Sc.(W.Aust.), M.Sc.
- Programmer - Patricia N. McCarter, B.Sc.(W.Aust.)
- Part-Time Programmer
(A.R.G.C. Grant) - J. Belinda Pearson, B.Sc.(Melb.), B.Ec.
- Research Assistant - Ellen M. Ward, B.A.(Fordham)

Visitors

- Professor W.J. Ewens (University of Pennsylvania) - June-August 1975
Dr S.I. Resnick (Stanford University) - September 1975-February 1976.

Publications

- Byron, R.P., "Testing Structural Specification Using the Unrestricted Reduced Form", Econometrica, 42 (1974), 869-883.
- Heyde, C.C., "Remarks on efficiency in estimation for branching processes", Biometrika, 62 (1975), 49-55.
- Heyde, C.C., "Kurtoses and departure from normality". In Statistical Distributions in Scientific Work, Ed. G.P. Patil, S. Kotz and J.K. Ord, D. Reidel Publ. Co., Dordrecht, 1975. Vol. I, 193-201.
- Heyde, C.C. and Feigin, P.D., "On efficiency and exponential families in stochastic process estimation". In Statistical Distributions in Scientific Work, Ed. G.P. Patil, S. Kotz and J.K. Ord, D. Reidel Publ. Co., Dordrecht, 1975. Vol. I, 227-240.
- Heyde, C.C., "On the central limit theorem and iterated logarithm law for stationary processes", Bulletin of the Australian Mathematical Society, 12 (1975), 1-8.
- Heyde, C.C., "A supplement to the strong law of large numbers", Journal of Applied Probability, 12 (1975), 173-175.
- Heyde, C.C. and Seneta, E., "The genetic balance between random sampling and random population size", Journal of Mathematical Biology, 1 (1975), 317-320.
- Heyde, C.C., "Martingale methods in estimation theory", Advances in Applied Probability, 7 (1975), 234-236.
- Heyde, C.C., "A non uniform bound on convergence to normality", Annals of Probability, 3 (1975), 903-907.
- Jarvis, R.A., "Optimisation Strategies in Adaptive Control: A Selective Survey", I.E.E.E. Trans. on Systems, Man and Cybernetics, SMC-5, No. 1, Jan. 1975, pp.83-94.
- Jarvis, R.A., "Adaptive Global Search by the Process of Competitive Evolution", I.E.E.E. Trans. on Systems, Man and Cybernetics, SMC-5, No. 3, May 1975, pp.297-311.
- Jarvis, R.A., "Image Segmentation by Interactively Combining Line, Region and Semantic Structure", Invited paper, Proc. Conference on Computer Graphics, Pattern Recognition and Data Structures, May 14-16, 1975, Beverley Hills, Calif., pp.279-288.
- John, S., "Median-unbiased most acceptable estimates of Poisson, binomial and negative-binomial distributions", Communications in Statistics, 3 (1974), 1155-1159.
- John, S., "Tables for comparing two normal variances or two gamma means", Journal of the American Statistical Association, 70 (1975), 344-347.

- Molinari, B.P., "The Stabilizing solution of the discrete algebraic Riccati equation", Institute of Electrical and Electronic Engineers, Transactions on Automatic Control, Vol. AC-20, No. 3, June 1975, pp.396-399.
- Molinari, B.P., "Non-negativity of a quadratic functional", S.I.A.M. Journal on Control, Vol. 13, No. 4, July 1975, pp.792-806.
- Molinari, B.P., "Conditions for non-positive solutions of the linear matrix inequality", I.E.E.E. Transactions on Automatic Control, Vol. AC-20, No. 6, Dec. 1975.
- Nicholls, D.F., Pagan, A.R. and Terrell, R.D., "The estimation and use of models with moving average disturbance terms: A survey", International Economic Review, Vol. 16, No. 1, February 1975, pp. 113-134.
- Pagan, A.R., "A Note on the Extraction of Components From Time Series", Econometrica, 43 (1975), 163-168.
- Pagan, A.R., "Optimal Control of Econometric Models with Autocorrelated Disturbance Terms", International Economic Review, 16 (1975), 258-263.
- Seneta, E., "Normed-convergence theory for supercritical branching processes", Stochastic Processes and their Applications, 3 (1975), 35-43.
- Seneta, E., "Characterization by functional equations of branching process limit laws", Statistical Distributions in Scientific Work (G.P. Patil, S. Kotz and J.K. Ord, eds.) Vol. 3, 249-254, 1975. Reidel, Dordrecht.
- Allen^{*}, Bronwyn, Anderssen[#], R.S. and Seneta, E., "Numerical investigation of infinite stochastic matrices", Computer Centre, Australian National University, Technical Report No. 48, March 1975, (60pp.).
- Galambos[†], J. and Seneta, E., "Record times", Proceedings of the American Mathematical Society, 50 (1975), 383-387.
- Valentine, T.J., "Adjustments in Employment, Overtime and Inventory Investment in the Australian Economy", The Economic Record, Vol. 51, June 1975, pp.232-241.

* Former member of Statistics, S.G.S.

† Not a member of this University.

Member of Computer Centre, A.N.U.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

Subject or Unit	Enrolled as at 30.4.75	Percentage of Number Enrolled			Percentage of Number Sitting						
		Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
A01 No. %	325 (100)	256 (79)	69 (21)	30 (9)	256 (100)	12 (5)	26 (10)	62 (24)		126 (49)	30 (12)
A03 No. %	120 (100)	76* (63)	44 (37)	8 (7)	76 (100)	3 (4)	5 (7)	7 (9)		53 (70)	8 (10)
B01 No. %	107 (100)	82 (77)	25 (23)	10 (9)	82 (100)				15 (18)	57 (70)	10 (12)
B01H No. %	17 (100)	13 (76)	4 (24)	0	13 (100)	8 (61)	1 (8)	1 (8)		3 (23)	
B03 No. %	1 (100)	1 (100)	0	0	1 (100)				1		
B03H No. %	2 (100)	2 (100)	0	0	2 (100)		1 (50)	1 (50)			
B04 No. %	19 (100)	16 (84)	3 (16)	0	16 (100)	1 (6)	1 (6)	6 (38)		8 (50)	
C01 No. %	14 (100)	9 (64)	5 (36)	2 (14)	9 (100)					7 (78)	2 (22)
C01H No. %	5 (100)	4 (80)	1 (20)	0	4 (100)		3 (75)	1 (25)			
C03 No. %	39 (100)	35 (90)	4 (10)	4 (10)	35 (100)				11 (31)	20 (57)	4 (12)

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

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

		Percentage of Number Enrolled				Percentage of Number Sitting						
Subject or Unit		Enrolled as at July 75	Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
A01	No.	152	126	26	12	126	8	15	26		65	12
	%	(100)	(83)	(17)	(8)	(100)	(6)	(12)	(21)		(52)	(9)
A02	No.	240	210*	30	16	210	14	26	35		119	16
	%	(100)	(88)	(12)	(7)	(100)	(7)	(12)	(17)		(56)	(8)
B02	No.	43	33	10	4	33				7	22	4
	%	(100)	(77)	(23)	(9)	(100)				(21)	(67)	(12)
B02H	No.	7	7	0	0	7	5		2			
	%	(100)	(100)			(100)	(71)		(29)			
B03	No.	28	21	7	3	21				6	11	4
	%	(100)	(75)	(25)	(11)	(100)				(29)	(52)	(19)
B03H	No.	5	5	0	0	5	1	1	1		2	
	%	(100)	(100)			(100)	(20)	(20)	(20)		(40)	
C02	No.	4	4	0	0	4				1	3	
	%	(100)	(100)			(100)				(25)	(75)	
C02H	No.	4	4	0	0	4	2	1	1			
	%	(100)	(100)			(100)	(50)	(25)	(25)			

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE
SECOND SEMESTER

Percentage of Number Enrolled

Percentage of Number Sitting

Subject or Unit	Enrolled as at July 75	Percentage of Number Enrolled			Percentage of Number Sitting						
		Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
C04	No. 28 % (100)	19 (68)	9 (32)	3 (11)	19 (100)				4 (21)	12 (63)	3 (16)
C04H	No. 1 % (100)	0	1 (100)	0							
C05	No. 4 % (100)	3 (75)	1 (25)	0	3 (100)				1 (33)	2 (67)	
C05H	No. 6 % (100)	6	0	0	6 (100)	4 (67)	2 (33)				

	<u>Enrolled</u> (as at 30.4.75)	<u>Sitting</u>	<u>Results</u>
Final Honours	1	1	H1
1 Part only		1	Result not finalised
Masters Qualifying	3	1	1 - fail 2 - withdrew
Masters Degree	7	1	1 - awarded subject to revision of Library copy 1 - withdrew
Ph.D.	6	1	1 - awarded

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE

FIRST SEMESTER

Percentage of Number Enrolled

Percentage of Number Sitting

Subject or Unit	Enrolled as at 30.4.75	Percentage of Number Enrolled			Percentage of Number Sitting						
		Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
B01	No. 246 % (100)	155 (63)	91 (37)	17 (7)	155	6 (4)	40 (26)	38 (25)		54 (35)	17 (11)
C01	No. 37 % (100)	22 (59)	15 (41)	2 (5)	22				5 (23)	15 (68)	2 (9)
C01H	No. 10 % (100)	6 (60)	4 (40)	0	6	1 (17)	5 (83)	0		0	0
C02	No. 15 % (100)	10 (67)	5 (33)	1 (7)	10				3 (30)	6 (60)	1 (10)
C02H	No. 6 % (100)	3 (50)	3 (50)	0	3	0	1 (33)	0		2 (67)	0

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE
SECOND SEMESTER

Subject or Unit	Percentage of Number Enrolled				Percentage of Number Sitting						
	Enrolled as at July 75	Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
B02	No. 106 % (100)	75 (71)	31 (29)	13 (12)	75	9 (12)	15 (20)	20 (27)		18 (24)	13 (17)
C03	No. 11 % (100)	7 (64)	4 (36)	1 (9)	7				2 (29)	4 (57)	1 (14)
C03H*	No. 3 % (100)	3 (100)	0	0	3	0	1 (50)	1 (50)	0	0	0
C04*	No. 23 % (100)	19 (83)	4 (17)	2 (9)	19				5 (28)	11 (61)	2 (11)
C04H	No. 10 % (100)	4 (40)	6 (60)	0	4	1 (25)	1 (25)	1 (25)		1 (25)	

* One result not yet finalized.

	<u>Enrolled</u> (as at 30.4.75)	<u>Sitting</u>	<u>Results</u>
Final Honours	4	4	(3H1, 1H2B)
Masters Qualifying	3	-	-
Masters Degree	5	-	-
Ph.D.	1	-	-